INDUSTRY 4.0

4TH INDUSTRIAL REVOLUTION

AMTEC TECHNIQUIP

Engineering The Future

Suppliers Of Educational Engineering Equipment & Accessories

MADE IN SOUTH AFRICA

30 YEARS OF ENGINEERING EXCELLENCE

BEE LEVEL 2 company 125% recognition

Amtec Techniquip applies 30 years of knowledge & experience in the design, manufacture and import of educational engineering equipment, accessories, instrumentation and consumables.

During this time, we have been a market leader in innovation, bringing many new concepts and products to the educational industry while expanding our comprehensive range of quality teaching equipment to a level unsurpassed by any other company in the industry.

This includes unique new methods of introducing and educating the learners in all facets of modern engineering. Our products are visual and demonstrational to best teach and explain concepts from basic engineering, all the way up to research and thesis levels in the most advanced forms of engineering.

Amtec Techniquip's commitment to the end user...

AMTEC offers a personal approach to each and every end user as we are always available to meet and discuss any requirements face-to-face basis to provide a tailor-made solution.

AMTEC have a large footprint throughout Southern Africa and regularly visit the countries and provinces we service while also keeping our customers up-to-date with any new products and innovations we bring to the market.

AMTEC supplies expert training on all our products. Our team of experts offer training at the end user or alternately at our head office in Jhb. All our products are supplied with their relevant manuals, course materials and exercise guides.

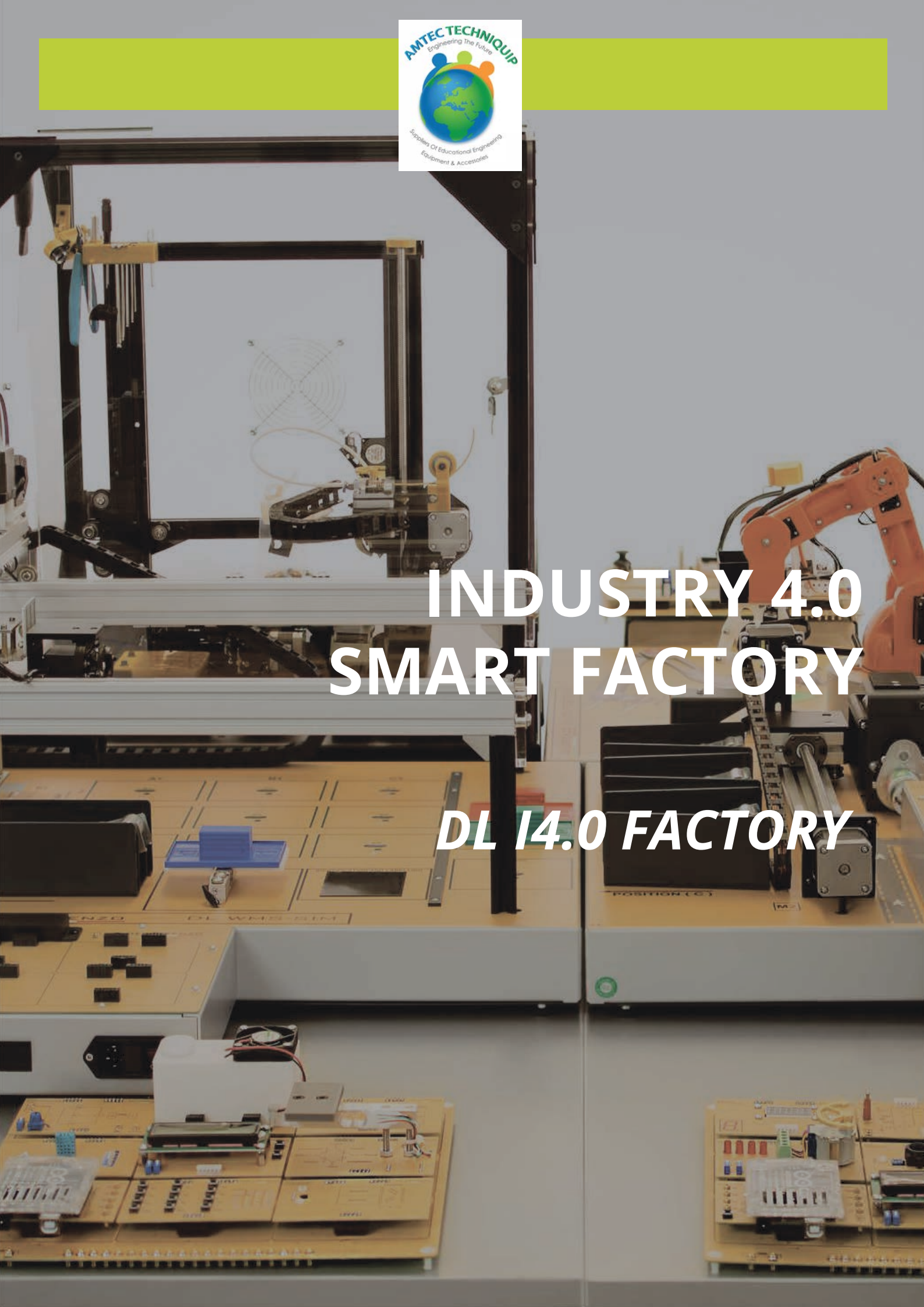
AMTEC offers unmatched after-sales service and customer support. All our equipment is supplied complete with ICT (Installation, Commissioning & Training). Our sales and support teams are at the end user's disposal should any assistance be needed during the life of a product.

AMTEC offers an extended Service and Maintenance plan to make sure that your equipment and apparatus are maintained to ensure a long lifespan with little or no downtime.

AMTEC makes use of only quality components to ensure reliability and longevity of all our manufactured equipment. This provides the end user with peace of mind and a product that will stand the test of time in an educational environment.

AMTEC has the manufacturing capability to R+D and manufacture "one-off" designs and customise any equipment within our range to meet the end users requirements. We have many accessories, add-ons and tooling that can work in conjunction with our equipment and trainers.

AMTEC offers a 24-month factory warranty on all our products supported by the backing of our local & international suppliers.



INDUSTRY 4.0 SMART FACTORY

DL I4.0 FACTORY

DESCRIPTION

De Lorenzo's solution creates a collaborative environment to study concepts related to Industry 4.0, integrating subsystems typically found in a production plant.

The trainer is composed of a set of electronic boards and simulators to study the different subsystems that can be found in a real production line.

Using an Arduino open-source microcontroller connected to a SCADA software for data acquisition and control, the students will be able to perform practices covering topics that range from the introduction to automation and robotics, communication protocols (IOT), sensors and actuators to a complete study of a productive system.

The trainer is composed of 4 subsystems. Each onecan be studied independently to execute practices covering topics ranging from the operation of sensors and actuators to the introduction of automation and robotics or linked together for the simulation of a more complex Industry 4.0 production line.

The student can acquire and analyze the data generated from the interactions between stations to manage and optimize the overall industrial process.

DL I4.0 FACTORY

CHARACTERISTICS

DIDACTIC APPROACH

- Multidisciplinary laboratory organized by levels ranging from the most basic concepts of electronics and automation to the simulation of an industrial process.
- Hands-on training platform based on experiments.

SKILLS DEVELOPMENT

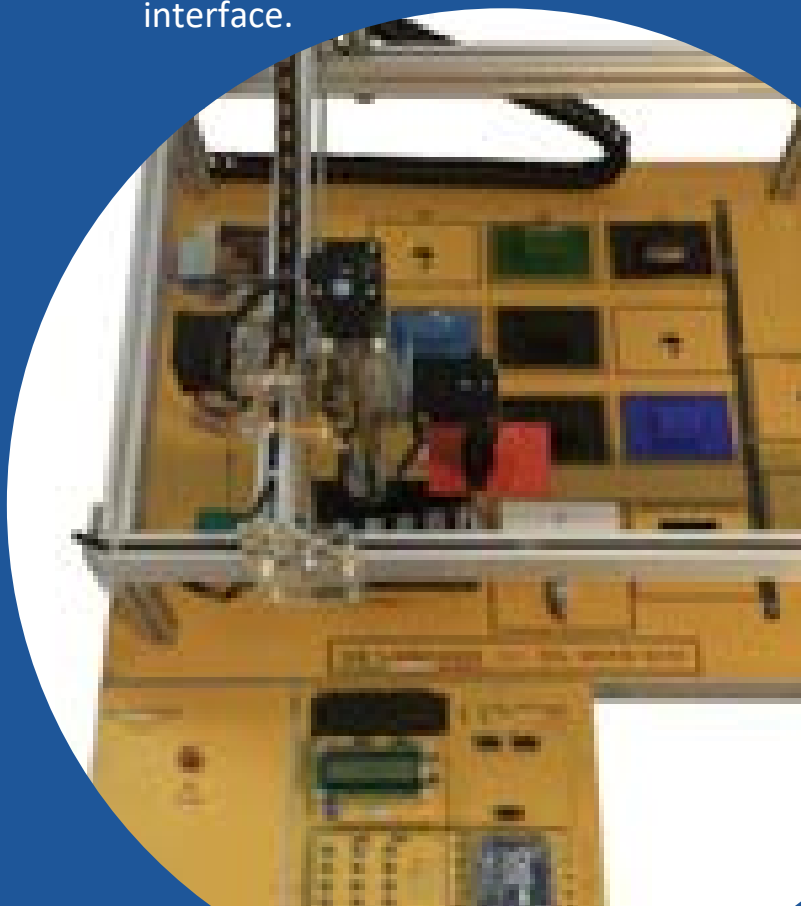
- Through an open source platform, students will be able to develop applications using programming and control techniques.
- The trainer is a platform to simulate real scenarios.
- Development of analytical and problem solving skills.

MODULARITY

- Collaborative environment to study Industry 4.0 concepts.
- Scale model of the systems that make up a factory 4.0.
- Modular reconfigurable laboratory.
- Platform for project development.

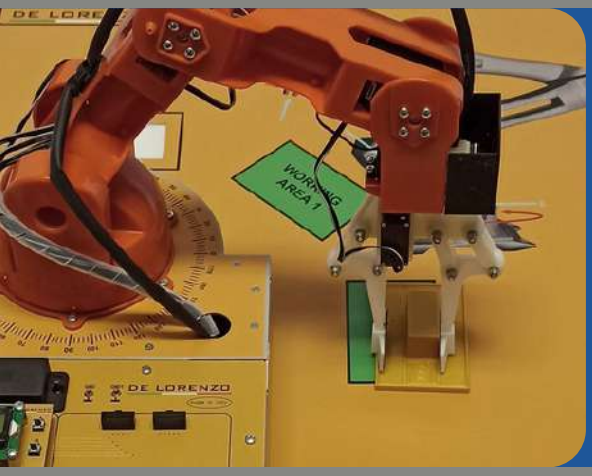
OPEN SCADA WEB

- Software to monitor and control all subsystems of the trainer.
- Learning platform based on a software structured using a didactic approach (CAI).
- Open and customizable software.
- Remote monitoring and control interface.



MODULARITY

RFID (RADIO-FREQUENCY IDENTIFICATION):
Use of RFID in industrial environments.
Product traceability



5-AXIS ROBOTIC ARM
Introduction to robotics

CONVEYOR BELT:
Introduction to automation
PLC programming

SEMI-AUTOMATIC WAREHOUSE:
Inventory management
Sorting algorithms

OPEN SCADA-WEB
DL I4.0 FACTORY
WITH A DIDACTIC APPROACH

1

The program is structured with a didactic approach, including the theoretical and practical information necessary to complete the proposed exercises.

2

OPEN CODE

The license allows students to create their own projects and customize them to show the parameters of interest.

3

INTELLIGENT MANAGEMENT

It is possible to generate automatic reports and control actuators for an "intelligent" management of a production process.

4

DISTANCE LEARNING

With the software you can remotely monitor the system from a local or remote PC using an Internet connection.

The SCADA software exchanges information with all of the trainer's subsystems, displaying sensor data and system status to monitor the system in real time.

The software also acts as a Computer Aided Instruction (CAI) software that guides the student through their learning path.

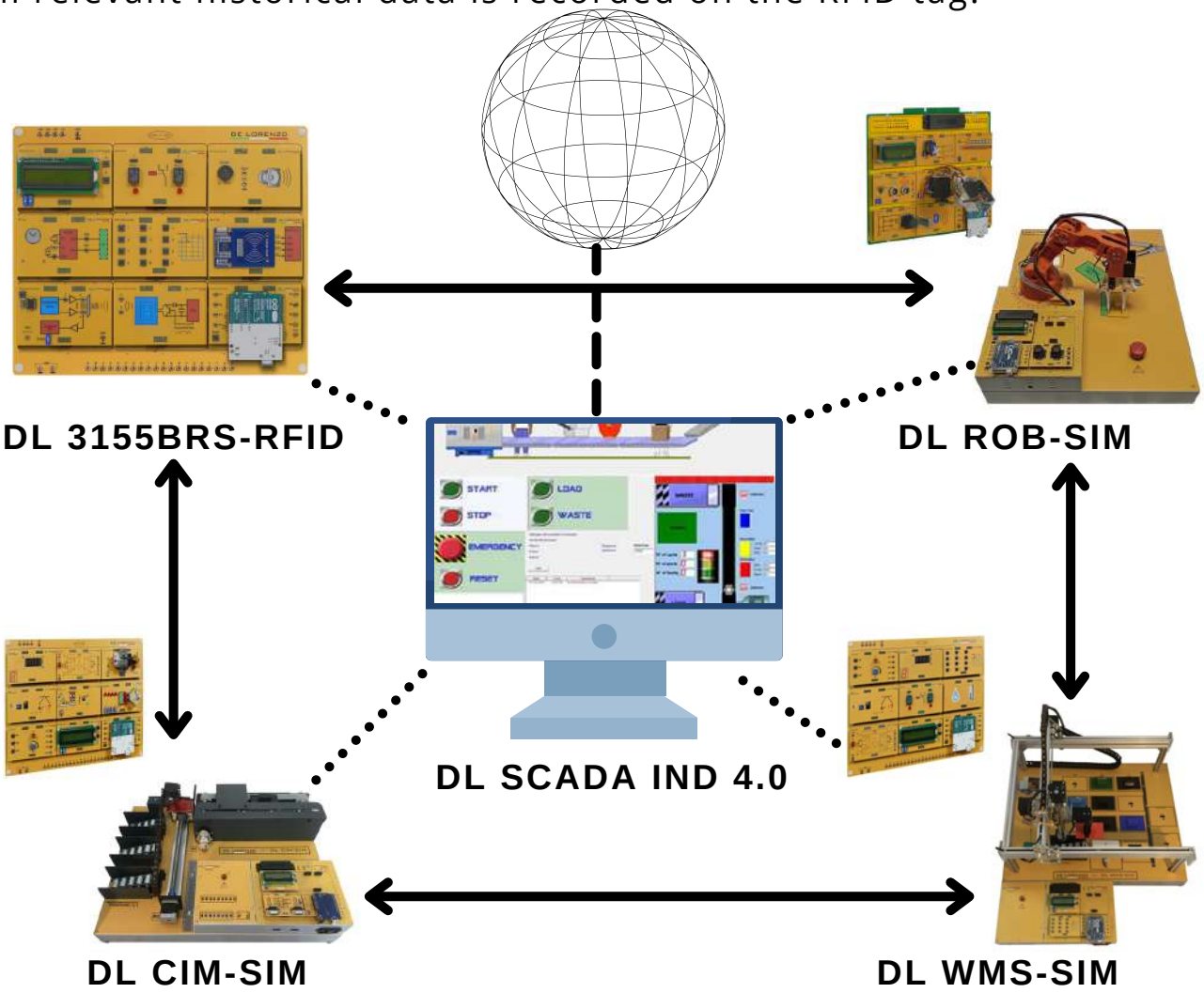
SYSTEM ARCHITECTURE

Through industrial SCADA software, all substations are able to exchange and display relevant information. The software is structured to follow a simulated manufacturing process that receives information from the user and generates report files that can be accessed remotely.

Processes implemented in the Software include:

- Processing a customer order.
- Generating a production order
- Generating a purchase order
- Managing and updating different bills of materials
- Monitoring the production process
- Managing inventories
- Creating packing lists

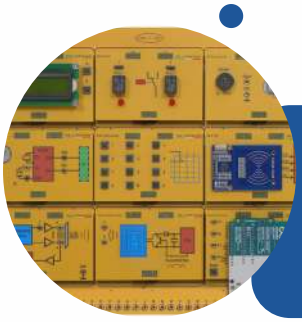
All relevant historical data is recorded on the RFID tag.



Didactic approach

Level 3: Integration of subsystems with a SCADA system to monitor and control a process.

Level 2: Integration of the different components in subsystems through an Arduino microcontroller.



Level 1: BRS circuit subboards to study individual components (sensors, actuators).

With this trainer, the student will become familiar with the different parts that make up a real industrial process and will learn the corresponding concepts gradually.

It will start with the study of the basic hardware up to the practical development of a scale model of the production line.

SKILLS DEVELOPMENT

TECHNICAL AND VOCATIONAL SCHOOLS

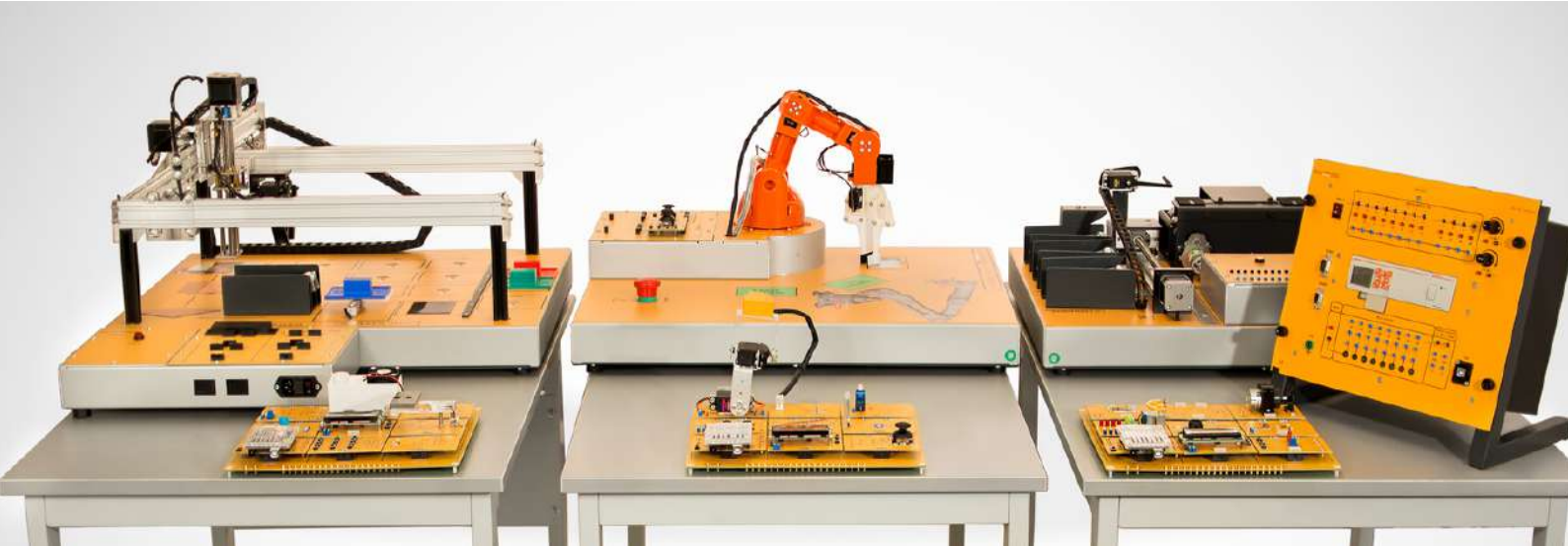
- Circuit theory
- Programming fundamentals
- Sensors and actuators

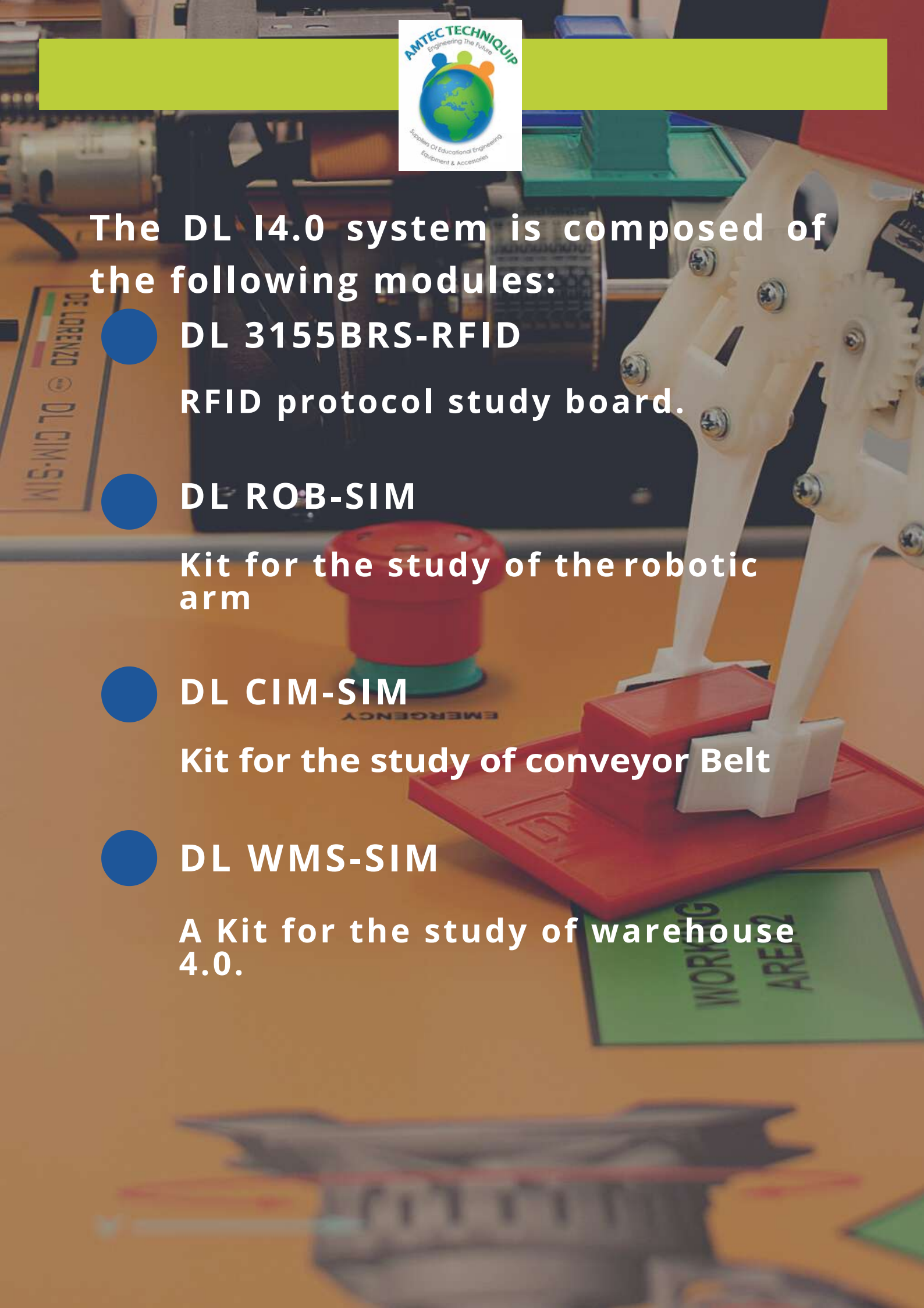
ROBOTICS, TELECOMMUNICATIONS AND ELECTRONICS ENGINEERING COURSES

- Study of communication protocols, RFID
- Bluetooth, IOT
- Automation and control theory
- Microcontrollers

ENGINEERING STUDIES

- Process theory and optimization
- Information theory
- Industrial automation





The DL I4.0 system is composed of the following modules:

- **DL 3155BRS-RFID**

  RFID protocol study board.

- **DL ROB-SIM**

  Kit for the study of the robotic arm

- **DL CIM-SIM**

  Kit for the study of conveyor Belt

- **DL WMS-SIM**

  A Kit for the study of warehouse 4.0.

DL 3155BRS-RFID

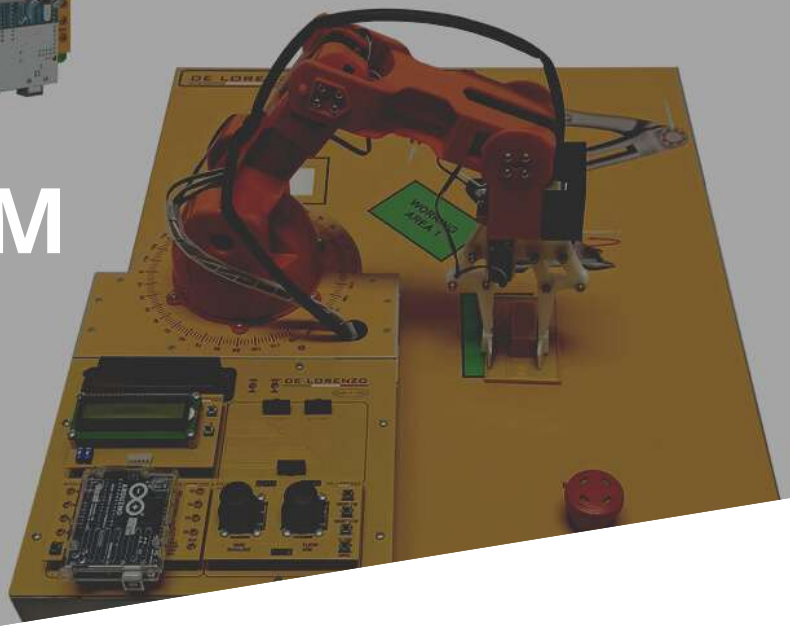
KIT FOR STUDY OF RFID APPLICATIONS

With this card, students can study the properties of an RFID system and all the components needed to develop a door access control system.

Learning experience

- Reader behavior when a tag is identified.
- How to read data from the proximity IC card using an RFID reader.
- How to read and write data blocks on a MIFARE proximity IC card.
- How to write personal data to a MIFARE proximity IC card using an RFID reader.
- How to read personal data on a MIFARE proximity IC card using an RFID reader.
- How to activate a relay using the microcontroller outputs.
- How to control a display using the microcontroller.
- How to control a real-time clock device using the microcontroller.
- How to connect a keyboard to a microcontroller.
- Simulation of a door access control system.

DL ROB-SIM



KIT FOR
THE STUDY OF THE ROBOT ARM

With this card system, students can study the properties of a 5-axis robotic arm used in industrial settings. Sensors and actuators are included to develop a complete course on robot control systems.

The system for studying the control systems of a 5-axis robotic arm is composed of two main elements:

- **A kit of mini board** to study the hardware characteristics and control techniques used in a robotic system by means of an open source microcontroller.
- **A real hardware simulator** of a 5-axis robotic arm used in an industrial environment.

DESCRIPTION OF THE SYSTEM

CIRCUIT BLOCKS

Kit composed of mini board for the propaedeutic study of the different elements that compose a robotic arm.

LEARNING EXPERIENCES

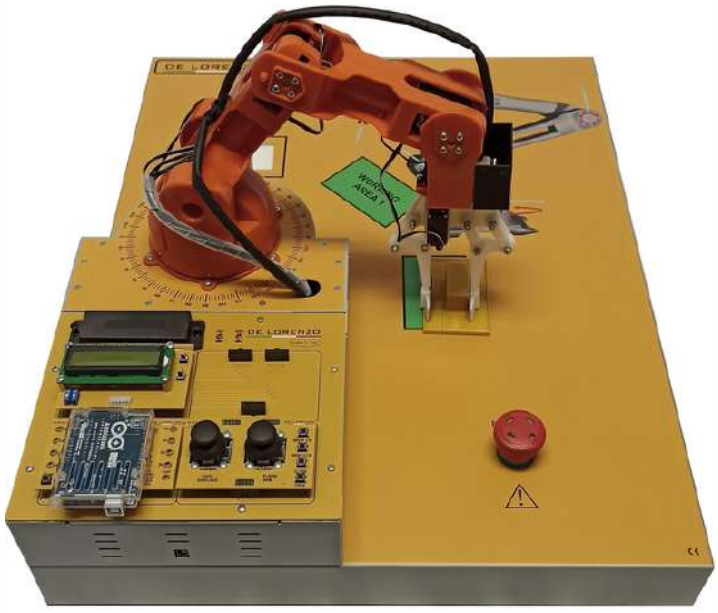
- Characteristics of a joystick controller and interface with the microcontroller.
- Study of the ultrasonic proximity sensor, servomotor and its controller.
- Introduction to Bluetooth standard and implementation of a Bluetooth interface with the microcontroller.
- Flex sensor analysis and its interface with the microcontroller.
- Control of an LCD display by means of an I2C communication interface.
- Measurement of orientation and angular velocity with a gyroscope.

HARDWARE SIMULATOR

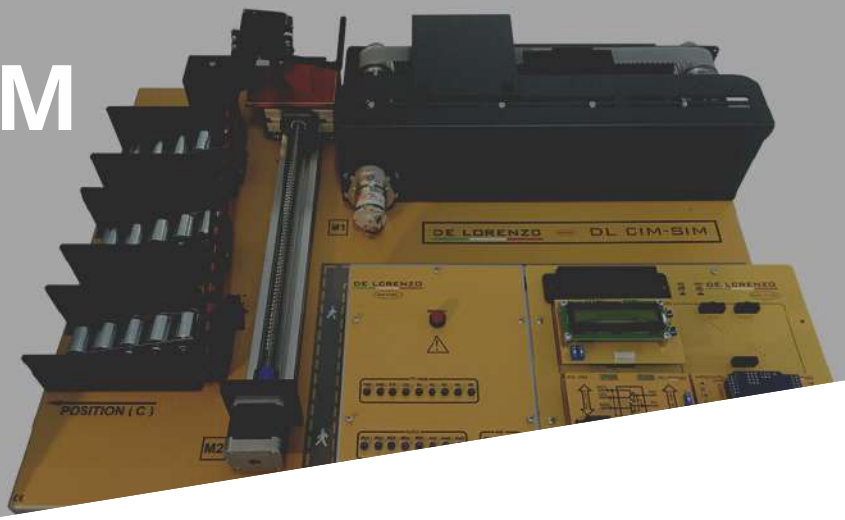
This system the student will experiment with different methods to control a 5-axis robotic arm and will increase the competence needed for HW design and SW programming of an electromechanical system.

LEARNING EXPERIENCES

- Study of the robot components.
- Control of the arm in real time by means of Joystick.
- Step-by-step programming of the movements.
- Recording of movements.
- Programming of the positioning in the Cartesian plane.
- Bluetooth communication.



DL CIM-SIM



KIT FOR THE STUDY OF A CONVEYOR BELT

With this training system, students can learn about the properties of a conveyor belt used in industrial environments. Sensors and actuators are included to develop a complete course on the main characteristics of conveyor systems and their applications.

The trainer for the study of a conveyor belt consists of two main elements:

- **A kit of mini board** to study the hardware features and control techniques of a conveyor belt.

- **A real hardware simulator** of a conveyor belt unit used in a real industrial environment.

DESCRIPTION OF THE SYSTEM

HARDWARE SIMULATOR

This system is primarily used to teach, demonstrate and experiment with different methods of controlling a conveyor belt.

The student will develop the skills for HW design and SW programming of an electromechanical system.

LEARNING EXPERIENCE

- Control of a conveyor belt through a push button panel.
- Use of a PLC to control the movement of the conveyor belt.
- Monitoring and identification of a processed part on the conveyor belt.
- Tracking the position of a part placed on the conveyor belt.
- Identifying and verifying the color of a part.
- Identify a defective part and place it in the correct location at the end of the line.

CIRCUIT BLOCKS

Kit composed of mini board for the propaedeutic study of the different elements that compose a conveyor belt system.

LEARNING EXPERIENCES

- Control of an LCD display through a microcontroller.
- Detecting an object by means of an infrared sensor.
- Monitoring of an RGB sensor.
- Control of a DC motor through a power controller.
- Control of a stepper motor.
- Action control and latching function via a pushbutton panel. Writing on a seven-segment display.

DL WMS-SIM

KIT FOR THE STUDY OF A SMART WAREHOUSE

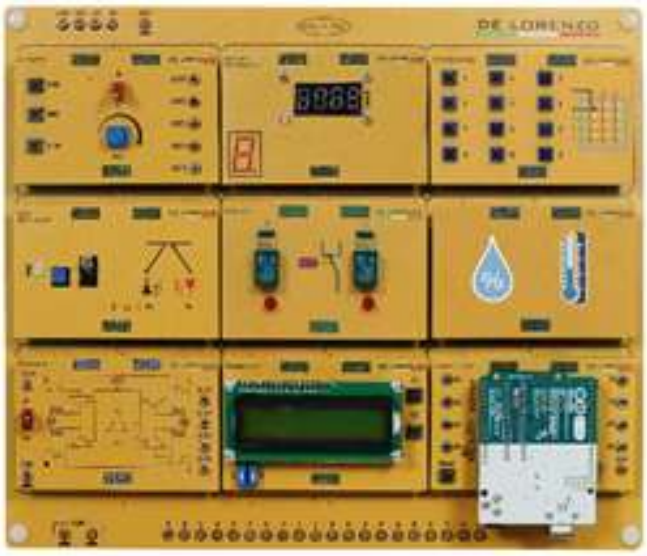
With this training system, students can learn about the properties of a semi-automatic warehouse that can be found in industrial environments.

The trainer for the study of a warehouse management system is composed of two main elements:

- **A kit of mini board** to study the hardware features and control techniques used in a semi-automatic warehouse.

- **A real hardware simulator** of a semi-automatic warehouse used in a real industrial environment.

DESCRIPTION OF THE SYSTEM



HARDWARE SIMULATOR

This system is primarily used to teach, demonstrate and understand the main features and operation of a pick and place system and a semi-automatic warehouse.

LEARNING EXPERIENCES

- Identifying and weighing an item.
- Manually assign an item to an item.
- Automatically assign an item to an item.
- Automatic inventory update.
- Manual picking of an item from the warehouse.
- Automatic picking of an item from the warehouse.

CIRCUIT BLOCKS

Kit composed of mini board for the propaedeutic study of the different elements that make up a semi-automatic warehouse.

LEARNING EXPERIENCES

- Control of an LCD display through a microcontroller.
- Weight measurement with a tension meter.
- External temperature and humidity monitoring.
- Implementation of a closed-loop ON-OFF controller for a temperature-humidity cycle.
- Implementation of a closed-loop PID controller for a temperature-humidity cycle.
- Performing measurements with a distance sensor.
- Interconnecting a keyboard to a microcontroller.

CONVEYOR BELTS FOR THE STUDY OF PLC PROGRAMMING AND SENSOR DL IND-02

The system allows for programming studies, operation studies and sensor detection, as well as practices with I/O ports, Modbus protocol and local and remote motor activation.

ABOUT THE PRODUCT

The product has a motorized conveyor belt capable of detecting moving pieces. Three types of pieces (plastic, aluminum, iron) are supplied and routed to a collection box. The pieces act on three types of sensors - normally used in automation – which are: One optical, one capacitive and one inductive, which by means of programming allow to separate and count, by type of material of the piece.

PRODUCT FEATURES

A PLC with 8 digital inputs and 8 digital outputs is incorporated in the unit and allows the carrying out of various activities to study the operation control of the conveyor and sensors, such as motor command, activation time, selective counting of pieces, etc.

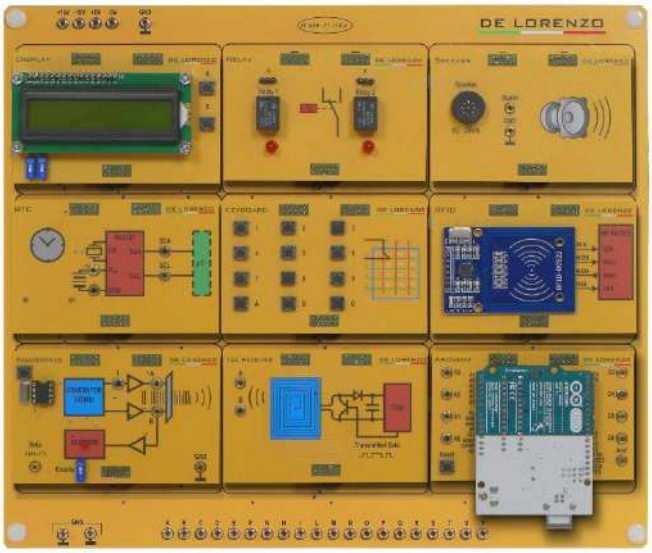
The product has input and output ports on its panel that allow its use via I-O and has a Modbus communication port to communicate with the serial route, reducing the number of connections. In addition, 24Vcc is available on the keyboard. The sensor information can be used in the application software. Twelve ports, in 2 mm terminal blocks, are available for the interface and seven LED-signaled digital outputs for status display. The internal source allows the use of the digital ports. The conveyor speed is obtained with a direct current yaw gear with a speed of 47 rpm.

DIDACTIC ACTIVITY

This input and output flexibility allows the use of the product with various control and command activities, study of generic PLC programming, in addition to those already available related to the operational analysis of sensors and belt drives. By accessing RS485 communication with MODBUS protocol, the student can create his or her own supervision.

The system is supplied with communication cables, programming cable, ladder application and exercise manual. Approximate dimensions are: L=600mm; A=240mm; P=350 mm

KIT FOR THE STUDY OF RFID APPLICATIONS



DL 3155BRS-RFID

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering.

With this board the students can study the properties of an RFID system and all components necessary to develop a door access control system.

The student will be able to interact with the hardware in a simple and intuitive way through a CAI software that explains step by step how the system works.

The system is provided with a SCADA software for the study of automation and industry 4.0 concepts, and can be combined with other trainers in the family to simulate a scaled down industry 4.0 factory.

LEARNING EXPERIENCES

- Behaviour of the reader when a tag is identified
- How to read data from proximity integrated circuit card using a RFID reader
- How to read and write data blocks on a MIFARE proximity integrated circuit card
- How to write personal data to a MIFARE proximity integrated circuit card using an RFID reader
- How to read personal data to a MIFARE proximity integrated circuit card using an RFID reader
- How to activate a relay using the outputs of the microcontroller.
- How to control a display by using the microcontroller
- How to control a real time clock device by using the microcontroller
- How to connect a keypad to a microcontroller
- Simulation of a door access control system

CIRCUIT BLOCKS

- Base board
- Real time clock mini board
- LCD Display mini board
- RFID Reader/Writer mini board
- Transponder mini board
- Audio speaker mini board
- Relay mini board
- Tag receiver mini board
- Keyboard mini board
- Micro-controller mini board

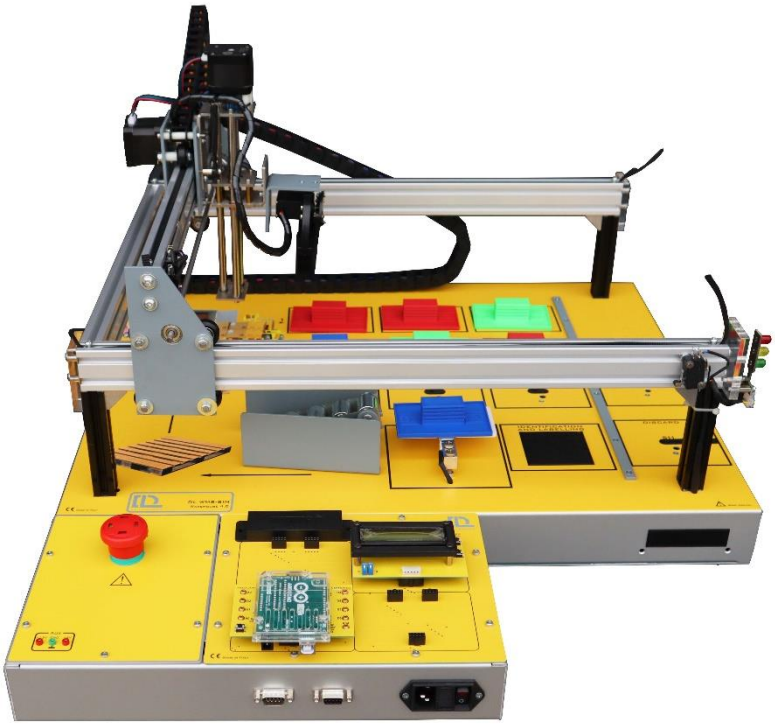
Complete with theoretical and practical manual.

Dimensions of the board: 297x260mm

ACCESSORY NEEDED:
DL 2555ALG - DC POWER SUPPLY

- ± 5 Vdc, 1 A
- ±15 Vdc, 1 A

KIT FOR THE STUDY OF A WAREHOUSE MANAGEMENT SYSTEM



DL WMS-SIM

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering.

With this training system, students can learn about the properties of a semi-automatic warehouse that can be found in industrial environments.
Sensors and actuators are included to develop a complete course on the main features of a semi-automatic warehouse and its management.

The student will be able to interact with the hardware in a simple and intuitive way through a CAI software that explains step by step how the system works.

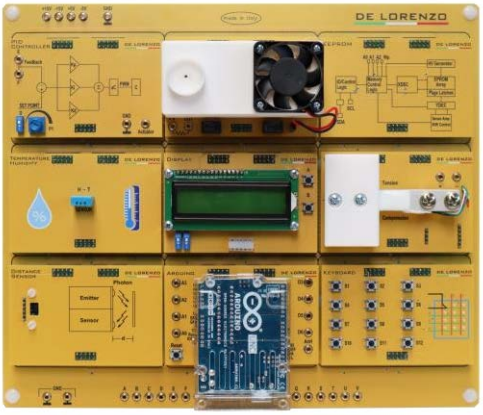
The trainer for the study of a warehouse management system is composed of two main elements:

- A **boards kit** to study the hardware characteristics and the control techniques used in a semi-automatic warehouse. The secondary boards include all the components, sensors and actuators needed to understand and manage the operation of a semi-automatic warehouse.
- **Real hardware simulator** of a semi-automatic warehouse used in a real industrial environment. Through this simulator, the student can learn how to operate and manage a semi-automatic warehouse. Its structure allows the connection of the board kit components, making them compatible with each other.

The system is provided with a SCADA software for the study of automation and industry 4.0 concepts, and can be combined with other trainers in the family to simulate a scaled down industry 4.0 factory.

System description:

BOARDS KIT



LEARNING EXPERIENCES

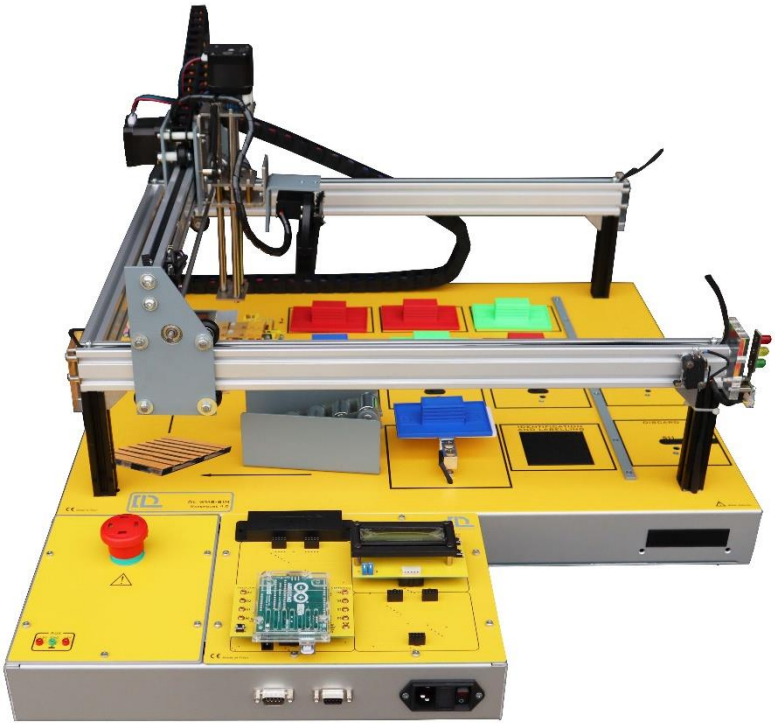
Kit composed of sub-boards for the propaedeutic study of the different elements that compose a semi-automatic warehouse. The sub-boards can interact with each other through a dedicated motherboard, allowing the student to perform interactive practices on different topics related to automation such as:

- Controlling a LCD display through a microcontroller.
- Measuring weight with a strain gauge.
- Monitoring external temperature.
- Monitoring external humidity.
- Implementing a closed loop ON-OFF controller for a temperature-humidity cycle.
- Implementing a closed loop PID controller for a temperature-humidity cycle.
- Performing measurements with a distance sensor.
- Interfacing a keypad to a microcontroller.
- Data storage on an external memory device.

CIRCUIT BLOCKS

- Base board
- LCD Display mini board
- Weight sensor mini board
- Distance sensor mini board
- Temperature and humidity sensor mini board
- PID controller mini board
- Keypad mini board
- Temperature-humidity cycle mini board
- EEPROM mini board
- Micro-controller mini board

HARDWARE SIMULATOR



DIDACTIC EXPERIENCE

This system is mainly used for teaching, demonstrating, and understanding the main features and operation of a pick and place system and a semi-automated warehouse.
The study of the semi-automatic warehouse allows the development, implementation and optimization of an application in the industrial field such as:

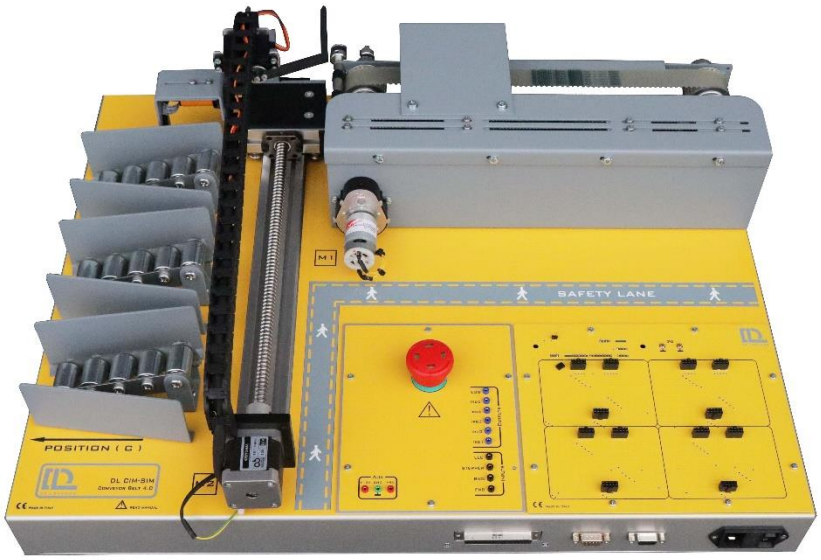
- Identification and weight of an item.
- Manually assign a position to an item.
- Automatically assign a position to an item.
- Automatic inventory update
- Manually picking an item from warehouse
- Automatically picking an item from warehouse

The system interfaces with SCADA software for monitoring and control.

TECHNICAL FEATURES

- Power supply: 90V-230V ±10%, 50/60Hz
- Horizontal warehouse divided in zones:
  - 1 position for parts acceptance
  - 1 position for discarded parts
  - 9 positions for storage
  - 1 position for product identification
  - 1 position for product weighing
  - 1 position for product expedition
- 3-axis Cartesian robot consisting of:
  - 3 Stepper motor linear actuators
    - Nominal voltage: 12Vdc
  - 1 gripper with servo motor
- Control box including:
  - Motor drivers.
  - Slots to insert system sub-boards.
- Compatible with Arduino UNO boards:
  - ATMEGA328 Processor
  - 32KB flash memory
  - 1KB EEPROM memory
  - 2KB SRAM memory
  - 23 general purpose I/O ports
- IR position sensors

KIT FOR THE STUDY OF A CONVEYOR BELT



DL CIM-SIM

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering.

With this training system, students can learn about the properties of a conveyor belt used in industrial environments. Sensors and actuators are included to develop a complete course on the main features of conveyor systems and their applications.

The student will be able to interact with the hardware in a simple and intuitive way through a CAI software that explains step by step how the system works.

The trainer for the study of a conveyor belt is composed of two main elements:

- A **boards kit** to study the hardware characteristics and the control techniques of a conveyor belt. The secondary boards include all the components, sensors and actuators needed to understand and manage the operation of a conveyor belt.
- **Real hardware simulator** of a conveyor belt unit used in a real industrial environment. Through this simulator, the student can learn how to operate and control a production line by using a PLC and an open source micro-controller. Its structure allows the connection of the board kit components, making them compatible with each other.

The system is provided with a SCADA software for the study of automation and industry 4.0 concepts, and can be combined with other trainers in the family to simulate a scaled down industry 4.0 factory.

System description:

BOARDS KIT

LEARNING EXPERIENCES

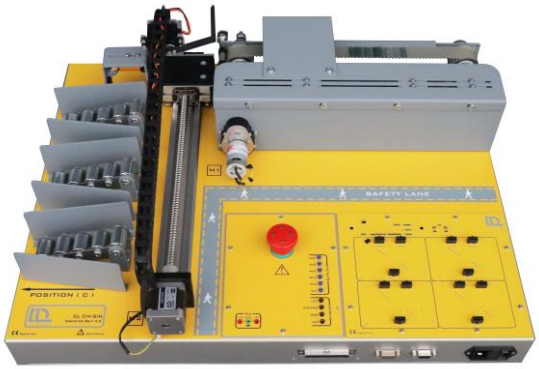
Kit composed of sub-boards for the propaedeutic study of the different elements that compose a conveyor belt system. The sub-boards can interact with each other through a dedicated motherboard, allowing the student to perform interactive practices on different topics related to automation such as:

- Controlling an LCD display through a microcontroller
- Detect an object using an infrared sensor.
- Monitoring a RGB sensor.
- Controlling a DC motor through a power driver.
- Controlling a stepper motor
- Action control and interlock function using a push button panel.
- Writing on a seven segment display

CIRCUIT BLOCKS

- Base board
- LCD display mini board
- DC motor driver mini board
- DC motor mini board
- Inputs mini board
- Seven segment display mini board
- Stepper motor mini board with driver
- IRD sensor mini board
- RGB sensor mini board
- Micro-controller mini board

HARDWARE SIMULATOR



DIDACTIC EXPERIENCE

This system is mainly used for teaching, demonstrating and experimenting with different control methods of a conveyor belt.
The student will improve the skills necessary for HW designing and SW programming of an electromechanical system.
A real PLC (supplied with the trainer) controls the sequential operation of the system, as in real automated processes, allowing the development, implementation and optimization of an application in the industrial field:

- Controlling a conveyor belt through a push button panel.
- Using a PLC to control the conveyor belt movement.
- Monitoring and identifying a processed part on the conveyor belt.
- Tracking the position of a part placed on the conveyor belt.
- Identifying and verifying the colour of a part.
- Identifying a defective part and placing it in the correct location at the end of the line.

The system interfaces with SCADA software for monitoring and control.

TECHNICAL FEATURES

- Power supply: 90V-230V ±10%, 50/60Hz
- DC motor driving the belt:
  - Speed: 10 rpm
  - Nominal voltage: 12Vdc
- Stepper motor linear actuator:
  - Nominal voltage: 12Vdc
- Servo motor:
  - Nominal voltage: 5Vdc
- Control box including:
  - Motor drivers.
  - Sensor and actuators input and outputs accessible through 2mm connectors.
  - Slots to insert system sub-boards.
- Compatible with Arduino UNO boards:
  - ATMEGA328 Processor
  - 32KB flash memory
  - 1KB EEPROM memory
  - 2KB SRAM memory
  - 23 general purpose I/O ports
- IR position sensors
- RGB Sensor
- RFID detector

ACCESSORY INCLUDED:

DL 2110AM

Programmable logic controller 12/10

PLC inputs:

- 8 digital inputs
- 4 digital/analog inputs

PLC outputs:

- 8 relay outputs
- 2 analog outputs (V/I outputs selectable)

Two voltage output 0-10 V controlled by potentiometer.

12 digital level switches

8 LEDs for displaying output states

24 V_{DC} Fixed voltage output

Programmable by USB port

Communication: Modbus RTU RS485

ACCESSORY NEEDED:

DL 2555ALG

DC power supply

- ± 5 Vdc, 1 A
- ±15 Vdc, 1 A

AUTOMATED FACTORY
PROGRAMMABLE MANUFACTURING CELL

DL CIM-PMC

CIM (computer integrated manufacturing) is a manufacturing method, in which the entire production process is automated and controlled by computer to reduce the errors and increase its efficiency.

The DL CIM-PMC is station-based modular training system, that simulates an automated factory.

Each manufacturing cell is controlled by a programmable logic controller (PLC) that allows the automation of the processes and the operation of the industrial production line.

It is a closed- loop control based on PLC that exchanges information collected from sensors and covers CIM system functional areas like design, analysis, planning, purchasing, cost accounting, inventory control, or more applied functions: materials handling and management, direct control, and monitoring of all the operations.

COMPOSITION

The system is composed of 3 main sections that can be used stand-alone or combined in a full production line:

DL CIM-PMC01: Material detection and transport station.

DL CIM-PMC02: Processing station with pneumatic press.

DL CIM-PMC03: Storage station with vertical warehouse.

TARGET

Ideal for 4 students to work simultaneously.

Vocational and technical schools

Applicable to courses in: **Automation, Electronics, Mechatronics, Electro pneumatics and Process Control.**

HIGHLIGHTS

The **DL CIM-PMC** is a compact solution that covers many ***transversal applications and didactic topics*** in the areas of Automation, Pneumatics, Mechatronics, Electronics, and Process Control.

It not only uses a ***proof of concepts*** approach; but it also simulates a real application of industrial sensors and actuators, programmable logic control (PLC), and dedicated information and computer technologies (ICT-s).

All training topics are designed to ***understand the CIM main functions and components***, where the sensors collect the information needed for inspections and handling, the actuators execute the process, and the PLC monitors and controls manufacturing algorithms.

The trainer implements ***sequential operations***, with some ***automated parallel work***. Each substation can be studied separately learning about its specific ***components and functionalities of each manufacturing phase***:

- Material transport and detection.
- Product assembly.
- Storage and Warehouse management.

The provided CIM software for PLC shows the ***openness of the system*** for expansion, or customization. At the same time, it can be a ready-for-industry implementation solutions because it has been tested on the CIM trainer.

TRAINING OBJECTIVES

The trainer focuses on the study of a programmable manufacturing cell and implementation of ***an industrial process.***

It demonstrates the role and the ***integration of the typical actuators (electric, pneumatic) into process executions***. The performances of the actuators influence the quality of industrial automation functions. Together with the sensors, they ensure and increase the value of manufacturing processes.

Sensors, actuators and transducers work together, allowing the students to perform practices on different topics related to automation such as:

- PLC programming.
- Material transport with conveyor belt.
- Using sensor for product detection (material, colour, and position).
- Understanding of an assembly process system.
- Use of a Cartesian robot with pneumatic gripper.

KEYWORDS

Computer Integrated Manufacturing, Automation, Pneumatics, Mechatronics, Electronics, Process Control, Industrial processes applications, Flexible Manufacturing Systems, design, analysis, planning, materials handling, direct control, manufacturing cell, PLC.

The figures with colors are only for references - they might vary from one version to another.

AUTOMATED FACTORY
MATERIAL TRANSPORT AND DETECTION STATION

DL CIM-PMC01

CIM (computer integrated manufacturing) is a manufacturing method, in which the entire production process is automated and controlled by computer to reduce the errors and increase its efficiency.

The **DL CIM-PMC01** reproduces a scaled-down **material detection and transport station.**

The manufacturing cell is controlled by a programmable logic controller (PLC) that allows the automation of the processes and the operation of the industrial production line.

It is a closed- loop control based on PLC that exchanges information collected from sensors and covers CIM system functional areas like design, analysis, planning, purchasing, cost accounting, inventory control, or more applied functions: materials handling and management, direct control, and monitoring of all the operations.

PROCESS DESCRIPTION

The automated factory simulates the assembly of cubes composed of two parts, a metal base and a plastic lid (black and white), joined together with plugs.

The DL CIM-PMC01 is the first station in the chain. It is composed of 2 vertical feed bins that contain the raw material (lower and upper parts of the cube). When a part is discharged on the belt, different sensors will detect its material, colour, and drilled hole before travelling to the next station to be processed or being discarded.

TARGET

Ideal for 4 students to work simultaneously.

Vocational and technical schools

Applicable to courses in: **Automation, Electronics, Mechatronics, Electro pneumatics and Process Control.**

TECHNICAL FEATURES

The DL CIM-PMC01 includes:

- Feed bin unit: used to store raw materials, consisting of upper metal feed bin and lower plastic feed bin. Both are equipped with a sensor to detect the feeding shortage, as well as a discharge cylinder. The Feed bin contain 12 lower metal covers, 6 black upper plastic covers, 6 white upper plastic covers and 1 lower undrilled metal cover for waste material detection. Housing cubes made of aluminum and Plastic covers (white and black).

- Detection unit: Different sensors are available to detect different materials qualities: Photoelectric sensor, Capacitive sensor, Inductance sensor, Fiber optical sensor, Magnet switch.

- Conveyor unit: forwards the work pieces and connect the workstations. The conveyor belt is driven by a stepper motor with adjustable speed.

- Control panel for monitoring the system in real time that include indicator lights (power on, stop, start, reset) and an emergency stop button.

- Siemens PLC-CPU1214C:
  - Includes the software for programming the PLC.
  - 32 I/Os at 24 Vdc: 22 input 10 outputs.
  - Communication interface.

- Power supply: AC power supply: single-phase 3-wire , AC 220V±10% 50 Hz.

The station is supplied with programming software, connection cables and working cubes.

TRAINING OBJECTIVES

The trainer focuses on the study of a programmable manufacturing cell and the functionality of a ***material transport and detection station.***

It demonstrates the role and the ***integration of the typical actuators (electric, pneumatic) into process executions***. The performances of the actuators influence the quality of industrial automation functions. Together with the sensors, they ensure and increase the value of manufacturing processes.

Sensors, actuators and transducers work together, allowing the students to perform practices on different topics related to automation such as:

- PLC programming.
- Material transport with conveyor belt.
- Using sensor for product detection (material, colour, and position).

AUTOMATED FACTORY
PROCESSING STATION

DL CIM-PMC02

CIM (computer integrated manufacturing) is a manufacturing method, in which the entire production process is automated and controlled by computer to reduce the errors and increase its efficiency.

The **DL CIM-PMC02** reproduces a scaled-down **processing station with pneumatic press.**

The manufacturing cell is controlled by a programmable logic controller (PLC) that allows the automation of the processes and the operation of the industrial production line.

It is a closed- loop control based on PLC that exchanges information collected from sensors and covers CIM system functional areas like design, analysis, planning, purchasing, cost accounting, inventory control, or more applied functions: materials handling and management, direct control, and monitoring of all the operations.

PROCESS DESCRIPTION

The automated factory simulates the assembly of cubes composed of two parts, a metal base and a plastic lid (black and white), joined together with plugs.

The DL CIM-PMC02 received the inspected material and relative information from the DL CIM-PMC01. The metal base, after having the pins inserted, is placed in the press where it is assembled with a plastic lid. The assembled cube is placed back on the belt and transferred to the next station for storage.

TARGET

Ideal for 4 students to work simultaneously.

Vocational and technical schools

Applicable to courses in: **Automation, Electronics, Mechatronics, Electro pneumatics and Process Control.**

TECHNICAL FEATURES

The DL CIM-PMC02 includes:

- Pin assembly unit: inserts 2 pins into the lower metal base. It consists of a material positioning mechanism, pin supply mechanism and pin assembly mechanism. It includes a shortage alarms and cylinders for intercepting, and pushing the metal base in the unit, and for feeding and pressing in the pins.

- General assembly unit: assemble the upper plastic cover and the lower metal cover, completing a finished cube. It consists of a transfer mechanism with a vacuum gripper to place the material on the assembly mechanism which includes the press cylinder.

- Conveyor unit: forwards the work pieces and connect the workstations. The conveyor belt is driven by a stepper motor with adjustable speed. Includes a light barrier for material detection at the conveyor's end.

- Control panel for monitoring the system in real time that include indicator lights (power on, stop, start, reset) and an emergency stop button.

- Siemens PLC-CPU1214C:
    - Includes the software for programming the PLC.
    - 44 I/Os at 24 Vdc: 26 input 18 outputs.
    - Communication interface.

- Power supply: AC power supply: single-phase 3-wire , AC 220V±10% 50 Hz.

The station is supplied with programming software, connection cables and working cubes.

TRAINING OBJECTIVES

The trainer focuses on the study of a programmable manufacturing cell and the functionality of an ***assembly station with a pneumatic press.***

It demonstrates the role and the ***integration of the typical actuators (electric, pneumatic) into process executions***. The performances of the actuators influence the quality of industrial automation functions. Together with the sensors, they ensure and increase the value of manufacturing processes.

Sensors, actuators and transducers work together, allowing the students to perform practices on different topics related to automation such as:

- PLC programming.
- Sensor setting.
- Understanding of an assembly process system.

AUTOMATED FACTORY
STORAGE STATION

DL CIM-PMC03

CIM (computer integrated manufacturing) is a manufacturing method, in which the entire production process is automated and controlled by computer to reduce the errors and increase its efficiency.

The **DL CIM-PMC03** reproduces a scaled-down **vertical warehouse storage station**.

The manufacturing cell is controlled by a programmable logic controller (PLC) that allows the automation of the processes and the operation of the industrial production line.

It is a closed- loop control based on PLC that exchanges information collected from sensors and covers CIM system functional areas like design, analysis, planning, purchasing, cost accounting, inventory control, or more applied functions: materials handling and management, direct control, and monitoring of all the operations.

PROCESS DESCRIPTION

The automated factory simulates the assembly of cubes composed of two parts, a metal base and a plastic lid (black and white), joined together with plugs.

The DL CIM-PMC03 received the inspected material and relative information from the DL CIM-PMC02. The assembled cube is placed in an empty slot of the warehouse based on its colour and the position predefined by the used. At the end of the process, the cubes can be manually extracted from the warehouse by opening the doors.

TARGET

Ideal for 4 students to work simultaneously.

Vocational and technical schools

Applicable to courses in: **Automation, Electronics, Mechatronics, Electro pneumatics and Process Control.**

TECHNICAL FEATURES

The DL CIM-PMC03 includes:

- Servo drive robot unit: Cartesian robot for placement on high rack storage system, consisting of 2 electric servo axes, one pneumatic gripper, one pneumatic rotary axis and a pneumatic axis for moving the gripper to the conveyor or into the storage area.

- Storage unit: vertical aluminium structure with 15 locations (3 rows x 5 columns) to store the finished cubes assembled in the previous stations.

- Conveyor unit: forwards the work pieces and connect the workstations. The conveyor belt is driven by a stepper motor with adjustable speed. Includes photoelectric sensors for positioning.

- Control panel for monitoring the system in real time that include indicator lights (power on, stop, start, reset) and an emergency stop button.

- Siemens PLC-CPU1214C:
    - Includes the software for programming the PLC.
    - 28 I/Os at 24 Vdc: 14 input 14 outputs.
    - Communication interface.

- Power supply: AC power supply: single-phase 3-wire , AC 220V±10% 50 Hz.

The station is supplied with programming software, connection cables and working cubes.

TRAINING OBJECTIVES

The trainer focuses on the study of a programmable manufacturing cell and implementation of ***a storage warehouse system.***

It demonstrates the role and the ***integration of the typical actuators (electric, pneumatic) into process executions***. The performances of the actuators influence the quality of industrial automation functions. Together with the sensors, they ensure and increase the value of manufacturing processes.

Sensors, actuators and transducers work together, allowing the students to perform practices on different topics related to automation such as:

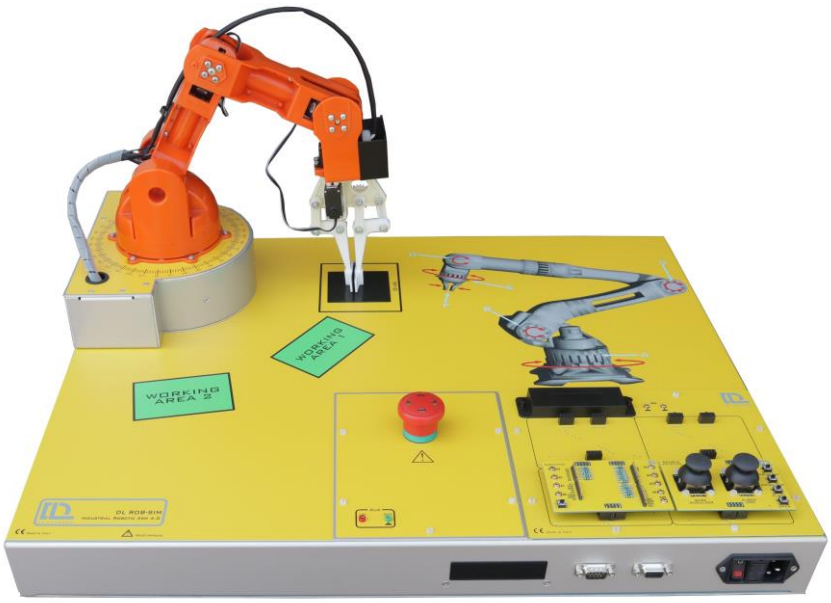
- PLC programming.
- Sensor setting.
- Use of a Cartesian robot with pneumatic gripper.

NECESSARY ACCESSORIES (optional)

Single-Phase Electro-Compressor
DL 8110SLZ

With very low noise level for small capacity.
Tank capacity: 24 litres
Air intake: 50 litres/min.
Max. working pressure: 8 bar or 116 PSI
Motor power: 0.34 kW or 0.45 HP
Noise level: 40 dB
Dimensions: 40 x 40 x 60 (h) cm.
Weight: 25 kg.

KIT FOR THE STUDY OF A 5-AXIS ROBOTIC ARM



DL ROB-SIM

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering.

With this training system, the students can learn about the properties of a 5-axis robotic arm used in industrial environments. Sensors and actuators are included to develop a complete course on robot control systems.

The student will be able to interact with the hardware in a simple and intuitive way through a CAI software that explains step by step how the system works.

The trainer for the study of control systems with a 5-axis robotic arm is composed of two main elements:

- A **boards kit** to study the hardware characteristics and the control techniques of a robotic system through an advanced open source microcontroller. The secondary boards include all the components, sensors and actuators needed to develop a didactic robotic arm.
- **Real hardware simulator** of a 5-axis robotic arm used in an industrial environment**.** Through this simulator, the student can learn how to operate a robotic arm through a programmed microcontroller. Its structure allows the connection of the board kit components, making them compatible with each other.

The system is provided with a SCADA software for the study of automation and industry 4.0 concepts, and can be combined with other trainers in the family to simulate a scaled down industry 4.0 factory.

System description:

BOARDS KIT

LEARNING EXPERIENCES

Kit composed of sub-boards for the propaedeutic study of the different elements that compose a robotic system. The sub-boards can interact with each other through a dedicated motherboard, allowing the student to perform interactive practices on different topics related to robotics such as:

- Characteristics of a joystick controller and interface with the microcontroller.
- Study of a servomotor and its controller.
- Introduction to the Bluetooth standard and implementation of a Bluetooth interface with the microcontroller.
- Analysis of a flex sensor and its interfacing with the microcontroller.
- Study of an ultrasonic proximity sensor.
- How to control a LCD display through I2C communication interface.
- How to measure orientation and angular velocity using a gyroscope.
- Basic control techniques: controlling a servo using a joystick.
- Basic control techniques: displaying servo position on an LCD display.

CIRCUIT BLOCKS

- Base board
- Joystick mini board
- LCD Display mini board
- Servo-motor mini board
- Ultrasonic sensor mini board
- Flex sensor mini board
- 2 axis robot mini-board
- Gyroscope mini board
- Bluetooth mini board
- Micro-controller mini board

HARDWARE SIMULATOR

DIDACTIC EXPERIENCE

This system is mainly used for teaching, demonstrating, and experimenting with different control methods of a 5-axis robotic arm.
The student will improve the skills necessary for HW designing and SW programming of an electromechanical system.
The study of the electric manipulator allows the development, implementation and optimization of an application in the industrial field:

- Study of the robot components.
- Arm control in real time using a Joystick.
- Step by step movement programming.
- Movements recording.
- Bluetooth communication.

The system interfaces with SCADA software for monitoring and control.

TECHNICAL FEATURES

- Power supply: 90V-230V ±10%, 50/60Hz
- Angle/distance range:
  - 1° axis: 180°
  - 2° axis: 180°
  - 3° axis: 180°
  - 4° axis: 180°
  - 5° axis: 180°
  - 6° axis: Gripper opening (Max. 55 mm)
- Servo specifications:
  - Operating speed: 0.17-0.13sec / 60 grades (4.8-6.0 V with no load)
  - Stall torque: 13-15 kg-cm a 4.8/6 V
  - Operating voltage: 4.8 – 7.2 Volt
- Compatible with Arduino UNO boards:
  - ATMEGA328 Processor
  - 32KB flash memory
  - 1KB EEPROM memory
  - 2KB SRAM memory
  - 23 general purpose I/O ports
- Control box including:
  - Motor drivers.
  - Slots to insert system sub-boards.
- RFID detector

ROBOT - Basic manipulator

TECHNICAL SPECIFICATIONS

- 6-axis connection controlled by MIC
- 3-axis connection controlled by PLC
- Servo driven axis, long term
- Position accuracy: 0.1 degree
- Power supply: single-phase from the mains
- Axes range:
  1° axis: 180°
  2° axis: 180°
  3° axis: 145°
  4° axis: 180°
  5° axis: 180°
  6° axis: Adjustment of the clamp
- Work range: 400mm
- Max. speed per axis: 180 degrees/s
- Max. load: 250 g

TRAINING OBJECTIVES

Basic manipulator developed for teaching, demonstration, practical training and design in relation to the mechatronic, automation and information technology principles.

Thanks to this product, it is possible to understand the mechanical structure of the robots used in the industrial sectors, design and execute debugging procedures for the control of the system, analyze and solve problems that occur in an actual operational process.

Based on the order code, it is possible to change the control unit by choosing between a microcontroller and a PLC.

ORDER CODE

- **DL ROBOT-PLC**
  (controlled by PLC)
  - PLC - 2080-LC30-48QVB: 28DI, 20DO, 3PTO
  - Manual control panel
- **DL ROBOT-MIC**
  (controlled by microcontroller)
  - ARM Cortex: M3, 8DI, 8DO, 6PTO
  - Manual control panel

EXPERIMENTS

- Software programming–learning
- Single axis control
- 6-axes combined control (MIC)
- 3-axes combined control (PLC)
- Soldering simulation

ELECTRIC 6-AXIS MANIPULATOR

This trainer simulates the operation of an industrial robot, such as: overall rotation, arm rotation, forearm rotation, wrist rotation, gripper rotation, gripper opening/ closing.

It integrates different technologies, such as belt drive transmission technology, stepper motor driving, position detection, PLC and microprocessor technology.

The trainer can be controlled by MCU and PLC.

TRAINING OBJECTIVES

This model is mainly used for teaching, demonstration, experiments, practical training, curriculum design and scientific research. It can train the students to know the mechanical structure and drive, to design and debug both hardware and software of the electrical control system, to analyze and solve the problems that occur in the actual operation process.

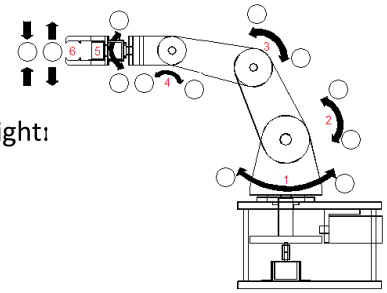
The electric manipulator is a typical product of the electromechanical integration technology. Its design and application have a very important meaning in mechatronics, automation, information technology, etc.

TECHNICAL FEATURES

- Power supply: 220V±10%, 50Hz
- Angles/distance range:
  - Manipulator rotation angle: 180°
  - Upper arm rotation angle: 90°
  - Forearm rotation angle: 90°
  - Wrist rotation angle: 90°
  - Gripper rotation angle: 180°
  - Gripper opening and closing: 0-40 mm.
- Stepper motors and drivers.
- Panel with buttons and PLC interface.
- Microprocessor control board with USB interface.
- PLC program and Microprocessor program

Complete with programming software in CD and manuals.

Dimensions:
Base size:
380x200mm, total height:
950mm
Weight: 27.5 kg.
Stepper motor: 6
Max load: 300g



ORDERING CODE

It is possible to order this product with two different codes. The code's choice is based on the PLC type to be included with the trainer.

DL ROBSIX-AB – with Alan Bradley PLC

DL ROBSIX-1200 – with Siemens PLC

DL FABLAB

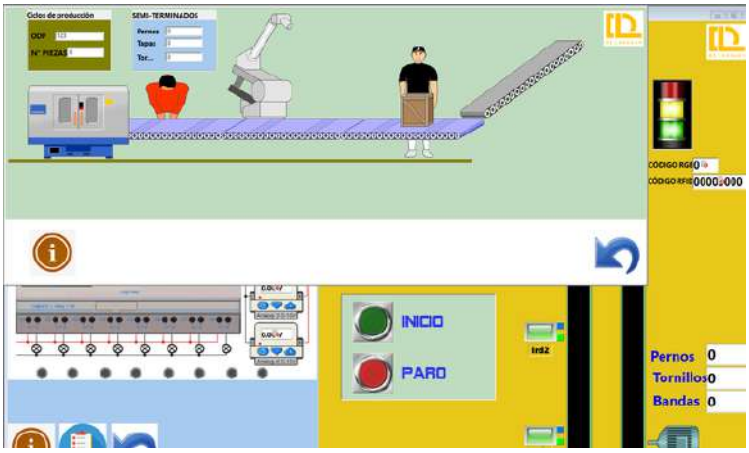
MANUFACTURING LABORATORY

De Lorenzo proposes the FABLAB, as a fundamental laboratory to help the student move into the future, taking the first steps in the world of 3D modeling.

The laboratory, which consists of a high performance 3D printer and a comprehensive didactic manual, aims to guide the student through a complete experience, starting from the mental conception of an object. The complete process proposed by De Lorenzo follows a 4-step cycle: design, modeling, 3D printing and application.

With detailed documentation accompanied by practical videos, the student will learn the basics of 3D modeling, mechanics and strength of the models, and will also master the preparation of print files to create objects indispensable in various professional areas.

SCADA SOFTWARE FOR INDUSTRY 4.0



CHARACTERISTICS

The Industry 4.0 training system is controlled by industrial SCADA (Supervisory Control and Data Acquisition) software that exchanges information with all subsystems of the trainer, displaying sensor data and system status for real-time control.

The software learning platform (CAI) is structured using a didactic approach, including the theoretical and practical information necessary to address the proposed topics.

PRACTICES

Through the monitoring system, all substations that make up the Industry 4.0 trainer are able to exchange data and display process-relevant information.

- Processing a customer order.
- Generate a production order.
- Generate a purchase order.
- Manage and maintain different bills of materials.
- Supervise the production process.
- Manage inventories.
- Create packing lists.

AMTEC TECHNIQUIP
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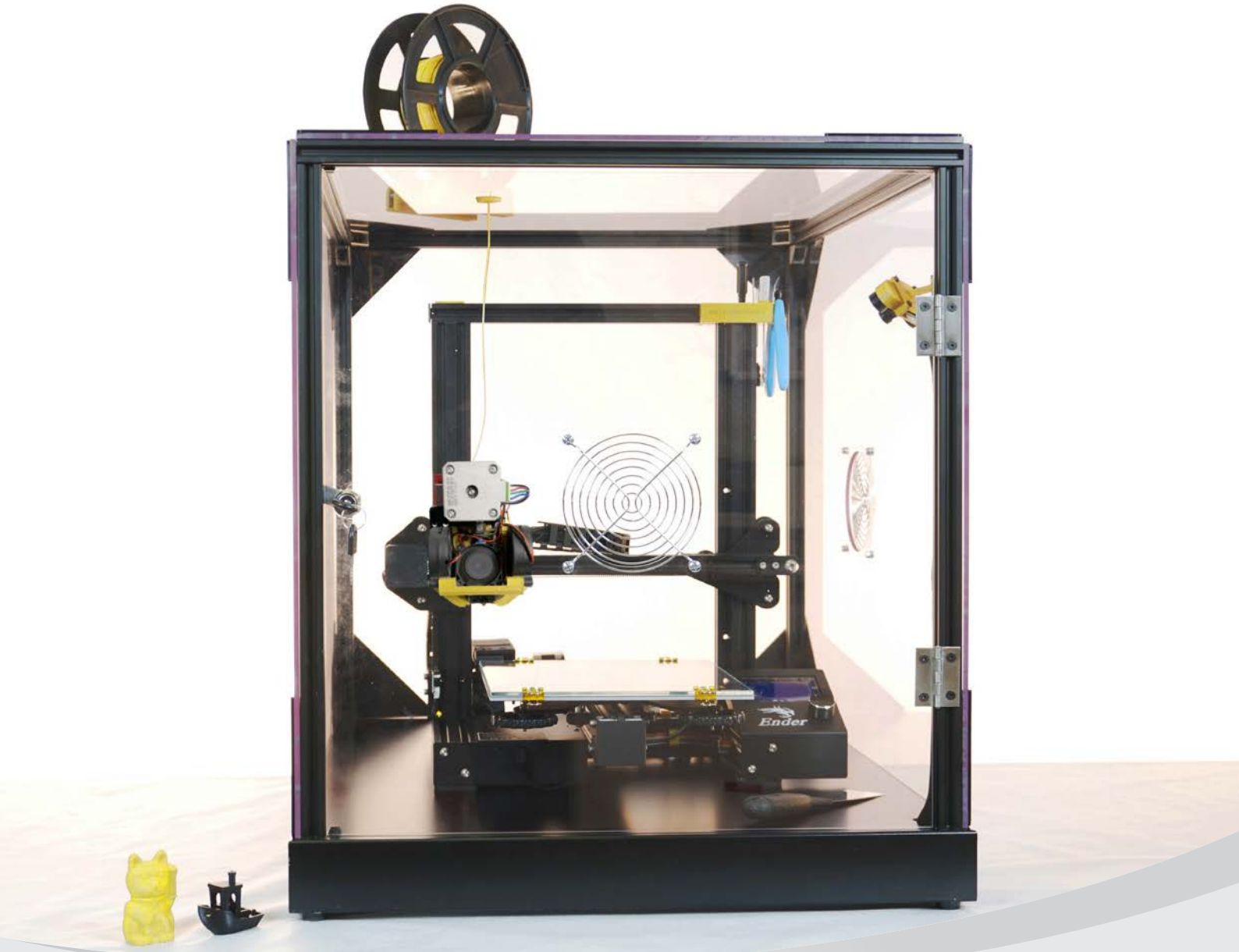
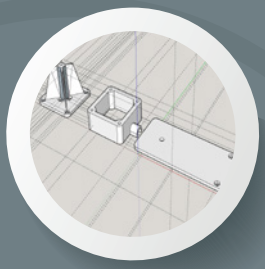
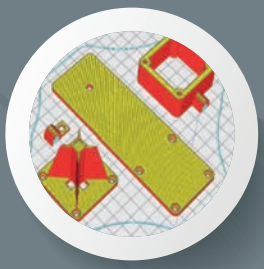
FABRICATION LABORATORY
DL FABLAB



Several technologies have transformed our world throughout history including the steam engine, the light bulb, the microchip, and the World Wide Web. The 3D printer is one of the most recent revolutionary technologies, that has changed the way we learn, do research and create prototypes, producing a physical object from scratch.

De Lorenzo proposes the FABLAB, a fundamental laboratory to help the student get into the future, taking the first steps into the world of 3D modeling. The laboratory, which consists of a high-performance 3D printer and a comprehensive didactic manual, aims to guide the student through an unprecedented complete experience, starting from the mental conception of an object, according to specific needs, until its physical production.

DESIGN 

SLICE 

PRINT 

The complete process proposed by Lorenzo follows a 4-step cycle: designing, modeling, 3D printing, and application.With detailed documentation accompanied by practical videos, the student will learn the basics of 3D modeling, the mechanics and resistance of the models, and will also master the preparation of printing files to create objects indispensable in areas such as prototyping, architecture, automotive and all those fields of application in which the collaboration of more partners was previously required.

DE LORENZO

De Lorenzo offers the best possible educational experience. The system allows not only the use of the 3D printer but also the creation of models based on particular needs.
The didactic material proposed by De Lorenzo consist of a comprehensive manual that covers the concepts of 3D modeling and a series of explanatory videos for a clearer presentation of the basic concepts.

The topics included in the teaching material are listed below:

1 . INTRODUCTION

- Unpacking
- Preliminary checks
- Precautions

2 . SET-UP

- Regulation of the sliding blocks (video)
- Filament insertion (video)
- Leveling the print bed (video)
- Preparation of the print bed

3 . PRINTING AN OBJECT

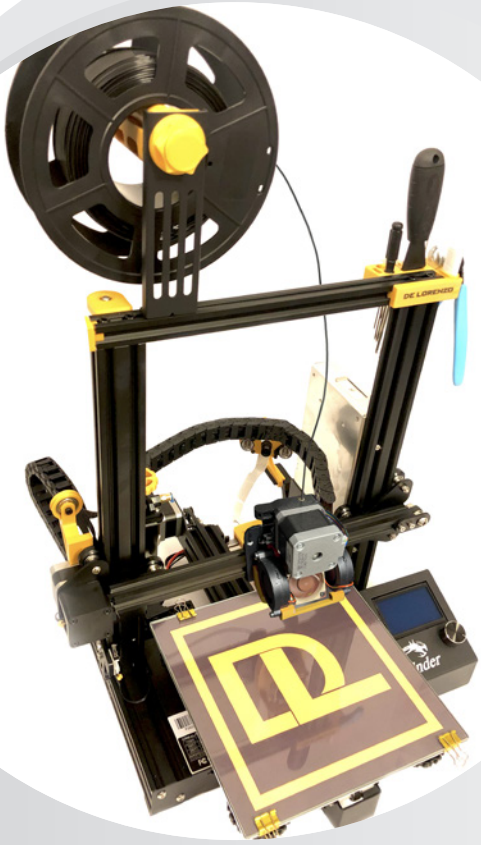
- Imagination and creation of an object
- Preparation of a simple model (video)
  - Interface and shortcuts
  - From 2-D to 3-D
  - Designing screw holes
  - Smoothing the edges of an object
  - Importance of measurements and tolerances
  - Cleaning-up the object before exporting
- Importing and setting-up in the slicer
  - Establishing printing speed and resolution
  - Filling up and outer thickness
  - Model orientation for printing optimization
- Preparation of a more complex model (video)
  - Variation of tolerances between the printed and coupled objects
  - Boolean technique
  - Preparing the object to be exported
  - Importing and setting-up in the slicer Cura
  - Placing multiple objects on the print bed
  - Identifying the most appropriate pint profile
  - Generation of the supports
  - Resistance of the object based on print orientation
- Uploading and copying the file for printing
- Preparation of the printing plane
- Precautions for more efficient printing

4 . MAINTENANCE

- Checking the sliding blocks
- Checking the print bed
- Filament replacement (video)
- Cleaning and replacing the nozzle (video)
- Silicone cover replacement
- Fan replacement
- Printing of the spare parts

The 3D printer proposed by De Lorenzo is sturdy and can withstand time, the exceptional super-tempered and heated glass guarantees flawless prints and their easy removal.
The professional quality of its frame extrusion ensures perfect positioning of the print nozzle and a very stable structure. The exclusive add-ons allow a better print quality, avoid annoying inconveniences that other printers have and allow to monitor and control the printer even remotely by having a video streaming of the piece being printed.

CREALITY ENDER 3 PRO 3D PRINTER



KEY FEATURES

Reel support

Thanks to the support mounted on ball bearings, the reel rotates without any friction, avoiding sub-extrusion events.

Cable holder chain

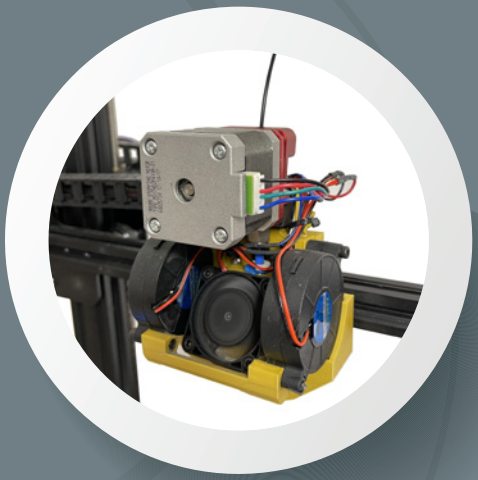
Entanglement and wear due to improper cable rotation are avoided with these 3 cable holder chains, also obtaining a cleaner design.

Tempered glass surface

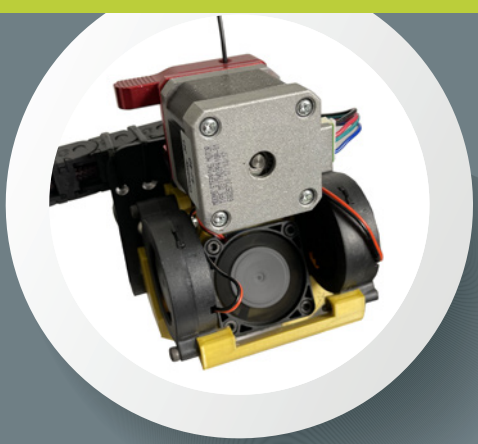
The very high quality accident-proof tempered glass makes it possible to print models with a perfect adhesion but also easy to remove.

Cooling device

The double channel EPR fang, with turbine fans, guarantees maximum filament cooling for perfect adhesion of the deposited layers.



DE LORENZO



Direct Drive Extruder

Easy filament insert/change avoiding clogging.

Reduces roughness ghosting and stringing effects during printing.

Remote control

With the integration of the latest generation, it is possible to connect remotely to watch the printing through an IR webcam, monitor temperature, progress and time-lapse videos of previous printings.

TECHNICAL FEATURES

Frame: made of precise and high quality aluminum extrusion
Printing technology: FDM (Fused Deposition Moulding)
Pint size: 220 * 220 * 250mm
Print speed: ≤180mm / s, normal 30-60mm / s
Precision: ± 0.1 mm
Layer thickness: 0.1mm-0.4mm
Nozzle diameter: standard 0.4 mm, supports 0,2,0,3 mm, etc.
Nozzle number: 1
Print bed temperature ≤110 °C
Print mode: online or offline SD card
File format: STL, obj, amf
Filament: PLA, ABS, Wood, TPU, shaded color, carbon fiber, etc.
Filament diameter: 1.75 mm
Software Slicer: Cura

SPARE PARTS

2 x Nozzle
1 x Silicone cover
1 x Fan
Printable files for spare parts*

CONSUMABLES

2 x Filament coil

*The printer can be used to print some of its parts in case they need to be replaced.

DE LORENZO

FLEXIBLE AUTOMATION MODULES (M.A.F)

GENERALITIES

The objective of this system is that automation training has a strong practical component and the different technologies (pneumatics, hydraulics, electronics, sensors, PLC´s, robotics, industrial communications, etc.) are studied in an integrated way, to allow the student develop a global vision of automation technology.

In this way, it is intended to respond to the growing complexity of manufacturing systems that makes continuous and intensive training necessary in the areas of:

* Design
* Assembly
* Programming and planning
* Start up
* Control of production lines
* Maintenance
* Industrial communications

Each station can work independently or in combination with others. It is intended that several groups of students work "simultaneously", each with a module and its PLC, and finally to have a common setting that allows the assembly of complete lines. This makes the system extremely flexible by allowing "all students" to work at the same time.

The delivered documentation divides the complete work cycle of each module into simple tasks to solve

- practical exercises, proposed in the work manual, that the student gradually tackles, which considerably improves the understanding of the control techniques used..

THE PROPOSED MODULES

Amtec Automation offers a system in which many more elements and techniques are studied, such as :

- Pneumatics
- Mechanics
- Electrics
- Electronics
- Sensorics
- PLC´s
- Industrial communications
- Robotics …

What is equivalent to a complete **MECHATRONICS** equipment and that, at the same time, can be easily expanded in the future:

In our proposals the concept of "Modularity" predominates. Thanks to its small size, it allows to have several modules on a table or work surface, combine the various modules or physically remove them from the assembly to work as a self-contained unit. For which, each module can be equipped with its own programmable PLC (or they can be whatever the school has, adapting the signals from the module's DB25 connector), and perform different exercises individually to become familiar with each MAF modular unit

When the optimal operation of each module has been achieved, two or more can be joined to complete more complex work cycles.

Instead of preparing "toy models", all the elements used (sensors, buttons, cylinders, valves, automatons, etc.) are industrial, robust and of recognized prestige brands., of very common use in the industry, which allows the student to work with real equipment, resistant and similar to those that he will find in his professional work

MAF-505 GRAVITY FEEDER

Flexible **A**utomation **M**odule "Gravity Feeder", ready to work directly with a PLC, initially individually and later combining it with other modules to carry out a manufacturing/automation process.

The module is made up of 1 vertical warehouse that is filled with round pieces. Designed to accept 30mm cylinders. in diameter of different materials (aluminum, black and white plastic). The extraction of the pieces towards the collection plate is carried out with a double-acting cylinder Ø20 mm. provided with 2 magnetic detectors for position control. The filling level is detected by a light barrier (or optional capacitive detector). The presence of a part on the collection plate will be detected by an electromechanical micro-switch.

The station is mounted on an aluminum base, measures 160 x 400 x 340 mm. Weight 2kg

Training and learning:
Designed for the study of pneumatic and electro- pneumatic technologies, as well as cylinder position detection by reed detector (magnetic), part extraction, part presence, light barrier, PLC programming, interpretation of diagrams and schematics, fault location and repair, safety and emergency conditions, mechanical, electrical and pneumatic commissioning.

Technical data:

Construction: *F-subplate 160 x 400mm.
*Connection interface
*Manifold valve unit
*Move out cylinder
*2 Slides: horizontal/vertical

Actuator: 1 double acting cylinder Ø20x30 mm. with 2 one way flow restrictors

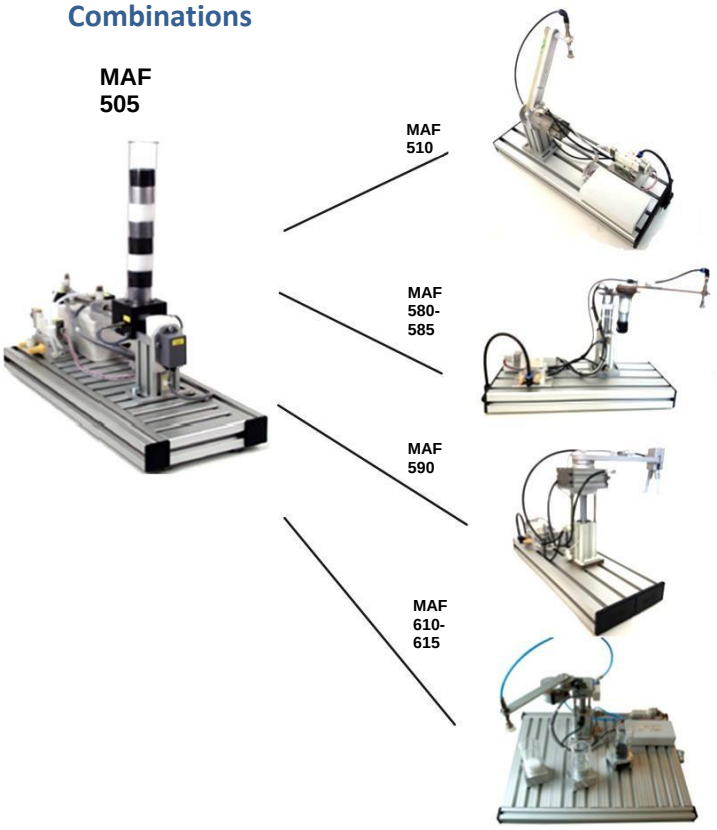
Electro valve: 1 5/2-way valve, bistable, 24Vdc, with leds and manual push buttons

Sensors: 2 magnetic "reed" sensors
1 micro switch
1 one way light barrier.

PLC wirings: Digital inputs / outputs 4DI / 2DO

Interface: Interface box with SUB-D 25 pin connector

Combinations



MAF-500 - GRAVITY FEEDER WITH PART DETECTION

Flexible **A**utomation **M**odule "Gravity Feeder With Part Detection", ready to work directly with a PLC, initially individually and later combining it with other modules to carry out a manufacturing/automation process.

The module is made up of 1 vertical warehouse that is filled with round pieces. Designed to accept 30mm cylinders. in diameter of different materials (aluminum, black and white plastic). The extraction of the pieces towards the collection plate is carried out with a double-acting cylinder Ø20 mm. provided with 2 magnetic detectors for position control. The filling level is detected by a light barrier (or optional capacitive detector). The presence of a part on the collection plate will be detected by an electromechanical micro-switch. The type of part is defined by the combination of optical and inductive sensors

The station is mounted on an aluminum base, measures 160 x 400 x 340 mm. Weight 2kg

Training and learning:
Designed for the study of pneumatic and electro- pneumatic technologies, as well as cylinder position detection by reed detector (magnetic), part extraction, part presence and type, sensors, light barrier, PLC programming, interpretation of diagrams and schematics, fault location and repair, safety and emergency conditions, mechanical, electrical and pneumatic commissioning.

Technical data:

Construction: *F-subplate 160 x 400mm.
*Connection interface
*Manifold valve unit
*Move out cylinder
*2 Slides: horizontal/vertical

Actuator: 1 double acting cylinder Ø20x30 mm. with 2 one-way flow restrictors

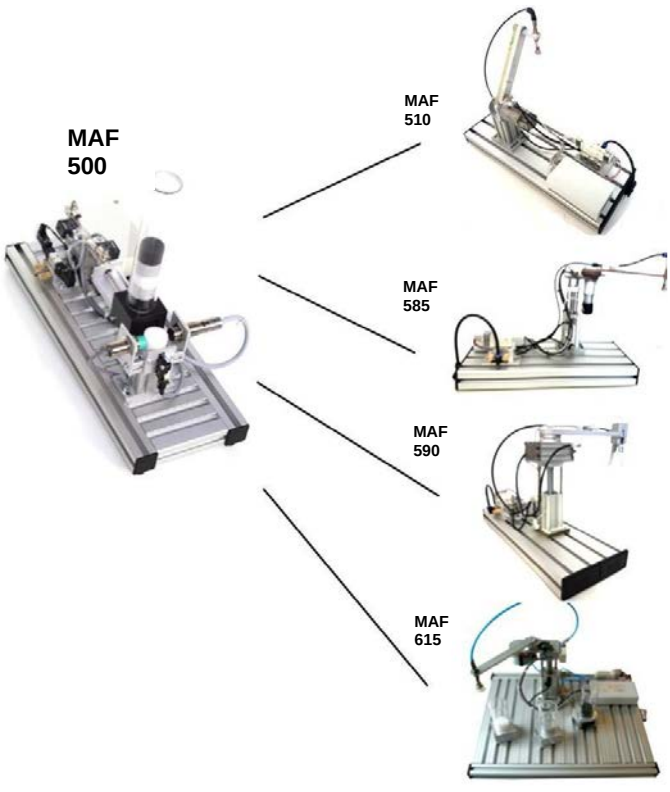
Electro valve: 1 5/2-way valve, bistable, 24Vdc, with leds and manual push buttons

Sensors: 2 magnetic "reed" sensors
1 micro switch
1 one-way light barrier 1 optical sensor
1 inductive sensor

PLC wiring: Digital inputs / outputs 6DI / 2DO

Interface Interface box with SUB-D 25 pin connector

Combinations



MAF-510 SWIVEL UNIT

Flexible **A**utomation **M**odule "Swivel Unit", ready to work directly with a PLC, in the beginning individually (Pick and Place) and later combining it with other modules to carry out a manufacturing/automation process.

The unit is provided with a 160mm swivel arm, driven by a rotating cylinder, equipped at its final end with a suction cup with a vacuum generator, which allows the transport of the extracted pieces from the collection plate of the previous station to the drop plate of the rear station. Rotary movement controlled by 5/3 solenoid valve, adjustable range (180º), with position detection by 2 reed sensors.

The station is mounted on an aluminum base, measures 160 x 400 x 340 mm. Weight 2.1 kg

Training and learning:
Transport mechanics of the "pick and play" swivel arm, the study of pneumatic and electro-pneumatic technologies, position detection of the rotating unit by "reed" sensors (magnetic), vacuum generation, PLC programming, interpretation of diagrams and schematics, fault location and repair, safety and emergency conditions, mechanical, electrical and pneumatic commissioning.

Technical data:

Construction: *F-subplate 160 x 400mm.
*Connection interface
*Manifold valve unit
*Pick and place unit
*Vacuum generator / Suction cup

Actuator: 1 rotary cylinder, with adjustable range (180º) and speed regulation by 2 one-way flow restrictors

Swivel arm: 1 swivel arm with suction cup on top with rotary movement by toothed belt

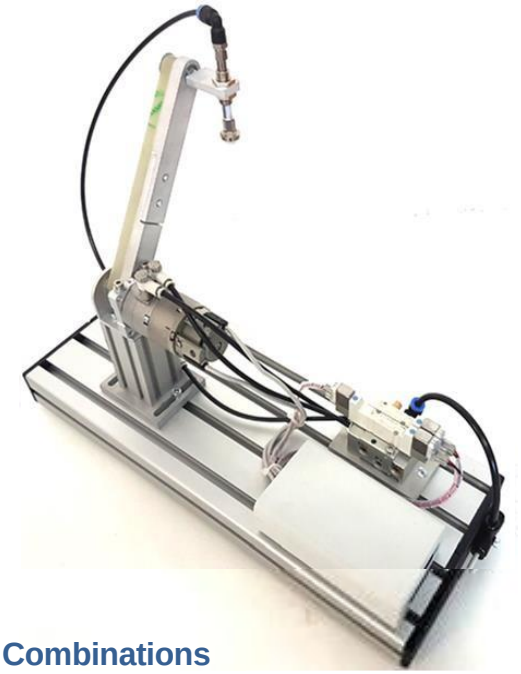
Ejector: 1 vacuum generator by venturi valve connected to a suction cup

Electro valves: 1 5/2-way valve, monostable, 24Vdc, with led and manual push button
1 5/3-way valve, NO in central position, 24Vdc, with leds and manual push buttons

Sensors: 2 magnetic "reed" sensors

PLC wiring: Digital inputs / outputs 2DI / 3DO

Interface Interface box with SUB-D 25 pin connector



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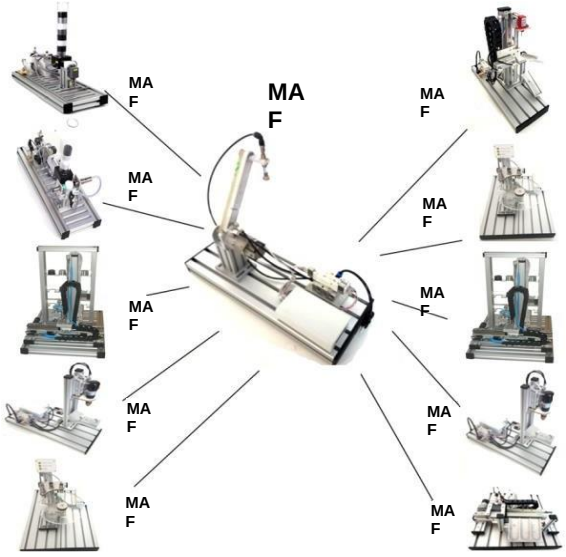


MAF-520
ANALOG METER – TESTING STATION

Flexible **A**utomation **M**odule "Analog Meter – Testing Station", ready to work directly with a PLC, in the beginning individually (analog signals) and later combining it with other modules to carry out a manufacturing/automation process.

The parts are raised in a vertical structure to the upper position against a measuring analog device that allows us to determine their thickness (0...10V signal evaluation). Depending on the part's thickness, it is taken to the intermediate position to be deposited in the next station or to the lower position for ejection by ramp.

The up/down movement of the vertical cylinder is carried out by a 5/3 solenoid valve. This cylinder has 3 "reed" sensors. The piece is ejected by a horizontal cylinder, controlled by a 5/2 monostable solenoid valve with 1 "reed" sensor.

The station is mounted on an aluminum base, measures 160 x 400 x 340 mm. Weight 5 kg

Training and learning:
Transport mechanics of the elevator cylinder, the study of pneumatic and electro-pneumatic technologies, position detection and stopping techniques of the rodless cylinder by "reed" (magnetic) sensors, PLC programming with digital and analog values, interpretation of diagrams and schematics, fault location and repair, safety and emergency conditions, mechanical, electrical and pneumatic commissioning

Technical data:

Construction: *F-subplate 160 x 400mm.
*Connection interface
*Manifold valve unit
*Vertical structure with rodless cylinder
speed regulation by 2 one way flow restrictors

Testing

*Measuring analog device
*Ejector cylinder and ramps

Actuators: 1 double acting rodless cylinder with 2 one way flow restrictors for speed regulation
1 double acting cylinder Ø20x30 mm: ejector cylinder with two ramps and

device: 1 vertical construction, elevate by rodless cylinder, with measuring device on the top by analog signal and two ramps

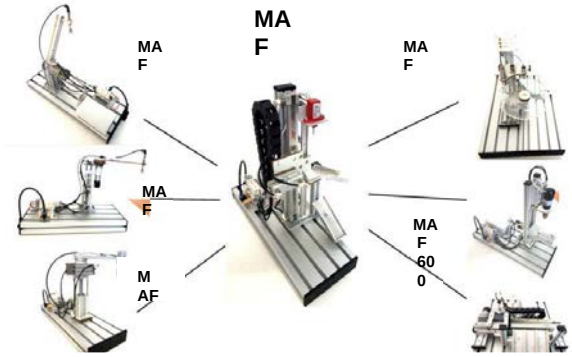
Electro valves: 1 5/2-way valve, monostable, 24Vdc,with led and manual push button
1 5/3-way valve, NO in central position, 24Vdc, with leds and manual push buttons

Sensors: 3 "reed" in rodless cylinder
1 "reed" in ejector cylinder 1 analog sensor 0...10V

PLC wiring: Digital inputs / outputs 4DI / 3DO Analog inputs: 1AI

Interface: Interface box with SUB-D 25 pin connector

Combinations



MAF-530
SORTING STATION

Flexible **A**utomation **M**odule "Sorting Station", ready to work directly with a PLC, in the beginning individually (sorting process) and later combining it with other modules to carry out a manufacturing/automation process.

The parts are moved along a linear axis to three classifying ramps depending on the type of piece and the filling level of each ramp is supervised by a light barrier.
The movement of the linear axis, which drives the workpiece carrier, is carried out by a 24Vdc electric motor and the positioning of each ramp by encoder (pulse counter) and the end positions by 2 microswitches. The parts are ejected to the classification ramp by a double-acting cylinder, controlled by a 5/2 monostable and reed detector.

The station is mounted on an aluminum base, measures 320 x 400 x 130 mm. Weight 4,2 kg

Training and learning:
Transport mechanics of the lineal axis, the study of pneumatic and electro-pneumatic technologies, position detection and stopping / ejecting techniques, pulse counting (light fork encoder) and PLC programming, interpretation of diagrams and schematics, fault location and repair, safety and emergency conditions, mechanical, electrical and pneumatic commissioning

Technical data:
Construction:
*F-subplate 350 x 400mm.
*Connection interface
*Relay control module: electric motor activation
*Manifold valve unit
*Electric lineal axis with workpiece holder and ejection cylinder
*Sorting ramps with filling verification by light barrier, three ramps.

Actuators: 1 electric lineal axis: servomotor reduction, 24Vdc, positioning by encoder and two microswitches; activated by two outputs of relay module
1 double acting cylinder Ø20x30 mm: ejector cylinder with speed regulation by 2 one way flow restrictors

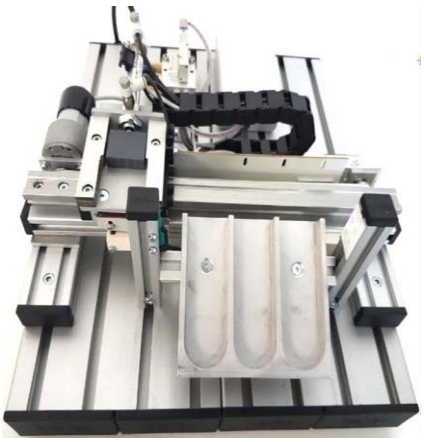
Sorting ramps: 3 ramps for the different type of parts, the filling level is detected by a light barrier

Electro-valve: 1 5/2-way valve, monostable, 24Vdc, with led and manual push button

Sensors: 1 light barrier
2 micro switches
1 magnetic "reed" sensor 1 encoder (light fork)

PLC wiring: Digital inputs / outputs 5DI / 3DO

Interface: Interface box with SUB-D 25 pin connector



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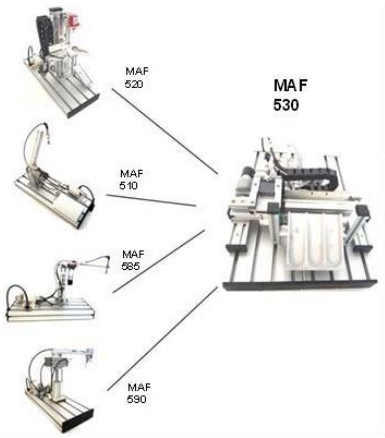


MAF-570
ROTARY INDEX TABLE

Flexible **A**utomation **M**odule "Rotary Index Table",

ready to work directly with a PLC, in the beginning individually (part detection and recognition) and later combining it with other modules to carry out a manufacturing/automation process.

An identification rotary table, with rotation by electric motor provided with 4 locations for pieces at 90º, detects and classifies the type of piece while it rotates. Workpieces must be deposited and picked up by other adjacent stations. A check unit mounted over the rotary index table with three sensors recognizes the workpieces when "present", "bright", "dark" and "metallic". The results can be displayed on the indication panel. The 90° positions are selected by an inductive sensor. The motor control is carried out with a relay.

The station is mounted on an aluminum base, measures 320 x 400 x 295 mm. Weight 4,8 kg

Training and learning:
Mechanics of positioning of the rotary axis and adjustment of the sensors for the correct stop and the detection of the piece according to the configured distance. Recognition of the type of part by combining the different sensors (inductive, capacitive and optical). Activation of indicator signal and control of a drive. PLC programming, interpretation of diagrams and schematics, fault location and repair, safety and emergency conditions, mechanical, electrical and pneumatic commissioning

Technical data:

Construction: *F-subplate 160 x 400mm.
*Connection interface
*Relay control module: electric motor activation
*Rotary table with 4 locations at 90º and electric drive
*Checking unit: 3 sensors for discriminating the type of part (inductive, optical and capacitive)
*Indicator panel, with 3 leds

Actuator: 1 geared electric motor of 24Vdc, for rotary table activation, with

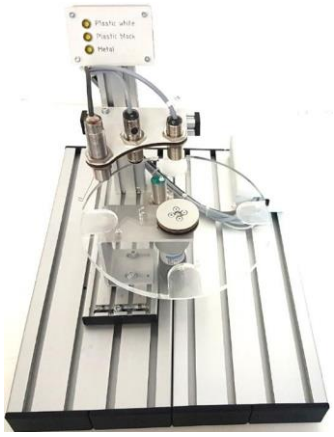
panel: 3 Leds in identification panel

Indicator positioning system by inductive detector and activation by 2 outputs to control relay module

Sensors: 2 inductive sensors
1 capacitive sensor
1 optical sensor

PLC wiring: Digital inputs / outputs
4DI/5DO

Interface: Interface box with SUB-D 25 pin connector



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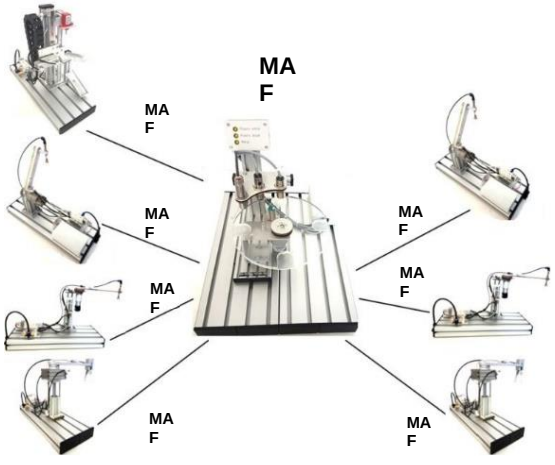


MAF-585 –
PICK & PLACE ELECTRICALLY

Flexible **A**utomation **M**odule "Pick and Place Electrically", ready to work directly with a PLC, in the beginning individually (pick and place technics) and later combining it with other modules to carry out a manufacturing/automation process

An electrically powered motor is lifted by a short- stroke cylinder. With a suction gripper, workpieces are picked up from another module at the first position and conveyed in a circle (0 - 375º) These workpieces can be placed at any position (i.e. every 5 °, implemented with a perforated disk and a fork light barrier: "encoder"). The end positions of the motor are secured and reported by two microswitches. At the end of the arm there is a suction cup for pick and place. The cylinder control as well as the activation of the vacuum takes place with two electromagnetic 5/2-way valves.

The station is mounted on an aluminum base, measures 160 x 400 x 230 mm. Weight 3 kg

Training and learning:
Mechanics of positioning of the rotary arm and adjustment of the sensors for the correct stop. Motor control and positioning by pulse counting. Electro- pneumatic technologies, as well as cylinder position detection by reed detector and speed regulation, pick and place of working pieces by vacuum techniques, PLC programming, interpretation of diagrams and schematics, fault location and repair, safety and emergency conditions, mechanical, electrical and pneumatic commissioning

Technical data:

Construction: *F-subplate 160 x 400mm.
*Connection interface
*Relay control module:
electric motor activation
*Manifold valve unit
*Electric swivel arm, with
encoder and microswitches
*Arm lift cylinder, with speed regulation by one way flow restrictors and reed detector.
*Vacuum ejector / Suction cup

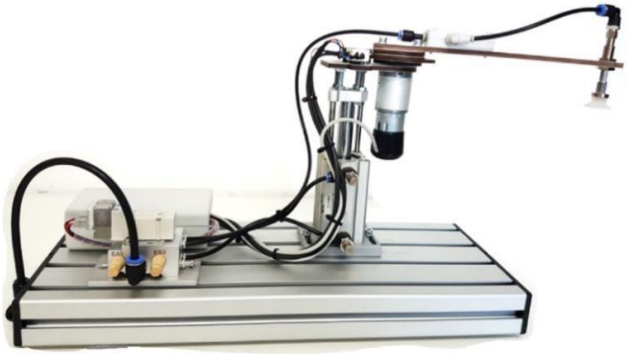
Actuators: 1 geared electric motor of 24Vdc, for swivel arm activation, with positioning system by encoder and
two micro-switches and activation by two outputs of control relay module.
1 double effect cylinder with flow restrictors and reed detector.
1 vacuum ejector with suction cup.

Electro valves: 2 5/2-way valves, monostable, 24Vdc, with led and manual push button, for cylinder control and vacuum ejector.

Sensors: 2 micro-switches
1 reed sensor
1 encoder with two channels

PLC wiring: Digital inputs / outputs 5DI / 4DO

Interface: Interface box with SUB-D 25 pin connector



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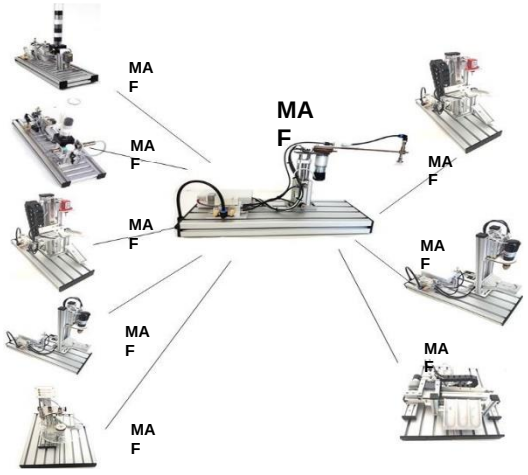


MAF-590
PICK & PLACE PNEUMATICALLY

Flexible **A**utomation **M**odule "Pick and Place Pneumatically", ready to work directly with a PLC, in the beginning individually (pick and place technics) and later combining it with other modules to carry out a manufacturing/automation process

A manipulator arm is lifted by a double-acting cylinder and rotates from 0 to 180º by a pneumatic rotary actuator. At the end of the arm there is an angular pneumatic clamp, with inductive clamp closing detector, to pick and place working-parts between adjacent stations. Stop positions and cylinder lift are defined by reed sensors. All the movements: rotation, elevation and opening-closing of the clamp are carried out by 5/2-way electromagnetic valves

The station is mounted on an aluminum base, measures 160 x 400 x 225 mm. Weight 3,5 kg

Training and learning:
Mechanics of positioning of the rotary arm and adjustment of the sensors for the correct stop. Collection, turning and positioning of parts by electro- pneumatic techniques, double-acting cylinder and rotary actuator with speed adjustments by one way flow restrictions. Angular gripper with open/close detection. PLC programming, interpretation of diagrams and schematics, fault location and repair, safety and emergency conditions, mechanical, electrical and pneumatic commissioning.

Technical data:

Construction: *F-subplate 160 x 400mm.
*Connection interface
*Manifold valve unit
*Arm lift cylinder, with speed regulation by one way flow restrictors and reed detector.
*Swivel arm, pneumatic rotary actuator, with two reed sensors and speed regulation, with a clamp at the end
*Pneumatic angular gripper with inductive sensor

Actuators: 1 double effect cylinder with two one-way flow restrictors and reed detector
1 pneumatic rotary actuator 0...180º with speed regulation and position detection by two reeds
1 angular gripper with open/close detection by inductive sensor

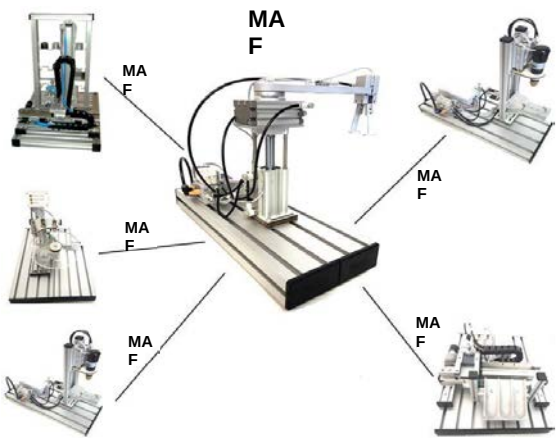
Electro valves: 2 5/2-way valves, monostable, 24Vdc, with led and manual push button, for cylinder control and vacuum ejector.
1 5/2-way valve, bistable, 24Vdc solenoids, leds and manual push buttons

Sensors: 1 inductive sensor
3 "reed" sensors

PLC wiring: Digital inputs / outputs 4DI / 4DO

Interface: Interface box with SUB-D 25 pin connector

Combinations



MAF-600 WORKING DRILL

Flexible **A**utomation **M**odule "Working Drill", ready to work directly with a PLC, in the beginning individually (pneumatics and drill motor activation) and later combining it with other modules to carry out a manufacturing/automation process

A drill is moved by a double-acting compact cylinder and simulates machining on the working part arranged on the piece tray by activating its electric motor through a contactor relay. The positions of both movements: drill and part tray, are defined by 4 reed detectors, located in the double-acting cylinders that carry out their movement.

The control of the elevation / descent of the drill, and of the positioning of the piece tray are carried out by 5/2 solenoid valves.

The station is mounted on an aluminum base, measures 160 x 400 x 225 mm. Weight 3,5 kg

Training and learning:
Mechanics of the displacement of the drill and the piece tray and adjustment of the sensors for the correct stop. Electro-pneumatic technologies, as well as cylinder position detection by reed detector and speed regulation Electric motor control by relay module. PLC programming, interpretation of diagrams and schematics, fault location and repair, safety and emergency conditions, mechanical, electrical and pneumatic commissioning

Technical data:

Construction: *F-subplate 160 x 400mm.
*Connection interface
*Manifold valve unit
*Relay control module: electric motor activation
*Drill, electric Vdc motor
*Vertical structure with double effect cylinder and drill
*Lineal axis, double effect cylinder with piece tray

Actuators: 1 vertical axis, double effect cylinder with two "reeds" and two one-way flow restrictors for speed regulation

1 lineal axis, double effect cylinder with two "reeds" and two one-way flow restrictors for speed regulation

1 electric motor, drill, turn in both directions by two outputs

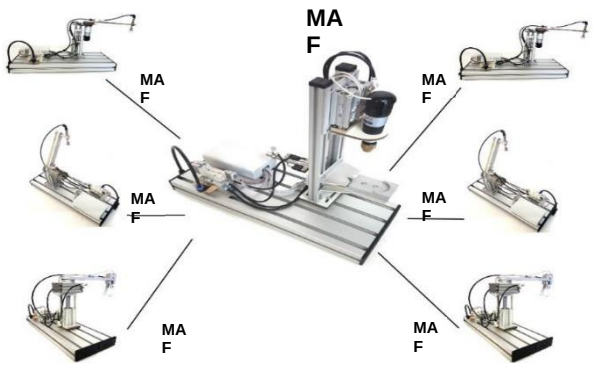
Electro valves: 1 5/2-way valve, monostable, 24Vdc, with led and manual push button. 1 5/2-way valve, bistable, 24Vdc with leds and manual push buttons

Sensors: 4 "reed" magnetic sensors

PLC wiring: Digital inputs / outputs 4DI / 5DO

Interface: Interface box with SUB-D 25 pin connector

Combinations



MAF-615
STORAGE STATION

Flexible **A**utomation **M**odule "Storage Station", ready to work directly with a PLC, in the beginning individually (pneumatics pick and place and electric motor activation- stop in storage positions) and later combining it with other modules to carry out a manufacturing/automation process

There are three vertical warehouses to house the types of parts, which are deposited by a manipulator arm with a suction cup and rotation driven by an electric motor. The arm is mounted on a compact double-acting cylinder, which raises/lowers, with a reed sensor for detection its position.

The rotation of the arm by geared motor and "light fork" encoder. From the initial position (defined by micro, to pick up another module) the working parts can be deposited in the range 0...375º (the positions are defined by the PLC program via encoder pulse counting, for example 5º per pulse). The control of the elevation / descent of the arm, and the suction of the part are carried out by monostable 5/2 solenoid valves and suction cup with vacuum ejector.

The station is mounted on an aluminum base, measures 360 x 400 x 225 mm. Weight 5 kg

*Arm lift cylinder, with speed regulation by one-way flow restrictors and reed detector.

*Vacuum ejector / Suction cup

*3 vertical warehouses

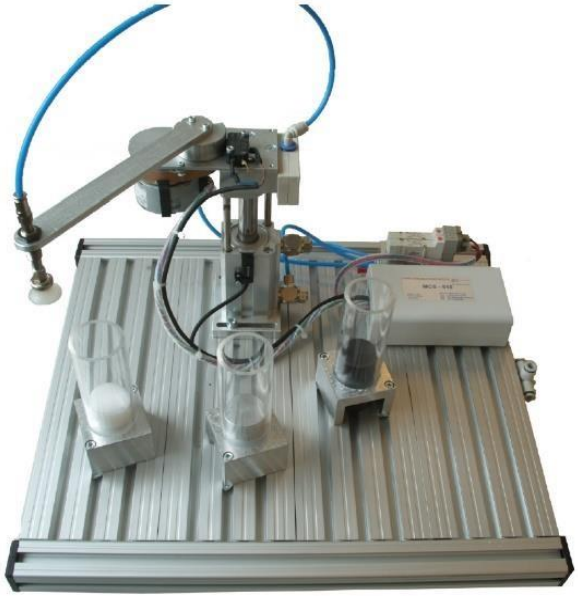
Actuators: 1 vertical axis, double effect cylinder with two "reeds" and two one-way flow restrictors for speed regulation 1 vacuum ejector with suction cup
1 electric gearmotor with encoder

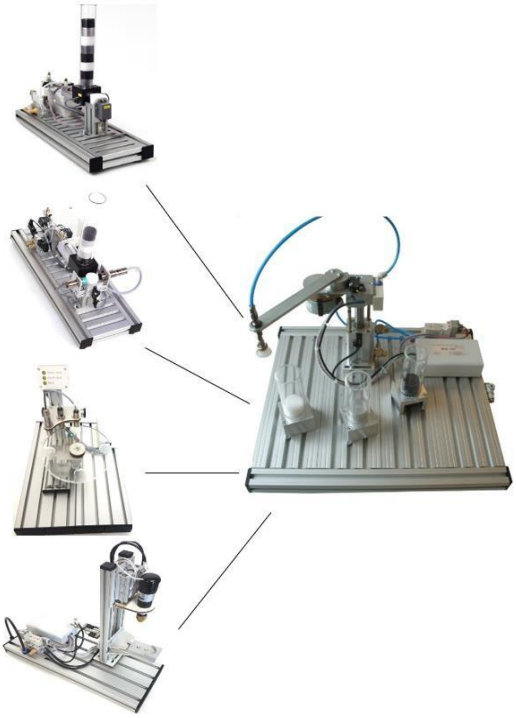
Electro valves: 2 5/2-way valve, monostable, 24Vdc,with led and manual push button.

Sensors: 1 "reed" magnetic sensor
2 micro switches
1 encoder with two channels

PLC wirings: Digital inputs / outputs
5DI / 4DO

Interface: Interface box with SUB-D 25 pin connector





MAF-620
HIGH RACK WAREHOUSE

Flexible **A**utomation **M**odule "High Rack Warehouse", ready to work directly with a PLC, in the beginning individually (classification / storage parts process) and later combining it with other modules to carry out a manufacturing/automation process

One electric linear unit with tooth belt drive and two pneumatic linear units take the workpiece from a warehouse position and bring it to a delivery position (or vice versa). The warehouse has 3 racks at different heights. The ends of the horizontal electrical axis X are determined by two microswitches and those of the vertical axis Z by two detectors. Two encoders are available to position both axes. A reflex light barrier enables workpieces to be recognized in the storage container. The pneumatic Y-axis is controlled with reed sensors. Motor control by reversing contactor circuit. The control of cylinders, axes Z and Y, is carried out by solenoid valves.

The station is mounted on an aluminum base, measures 360 x 400 x 450 mm. Weight 6,5 kg

Training and learning:
Mechanics of positioning and adjustment of the sensors (microswitches, reed, reflex...) for a correct positioning/detection of the part. Motor control and positioning by pulse counting. Electro-pneumatic technologies, as well as cylinder position detection by reed detector and speed regulation, PLC programming, interpretation of diagrams and schematics, fault location and repair, safety and emergency conditions, mechanical, electrical and pneumatic commissioning

Technical data:

Construction: * F-subplate 320 x 400mm.
*Connection interface
*Manifold valve unit
*Relay control module:
electric motor activation
* Electric linear guide, horizontal X axis.
*Pneumatic cylinder, Y axis
*Pneumatic rodless vertical cylinder, Z axis.
*Warehouse with 3 racks

Actuators: 1 electric lineal guide with two micro- switches and encoder
1 vertical rodless cylinder with two "reed", encoder and flow restrictions 1 pneumatic cylinder with two reeds

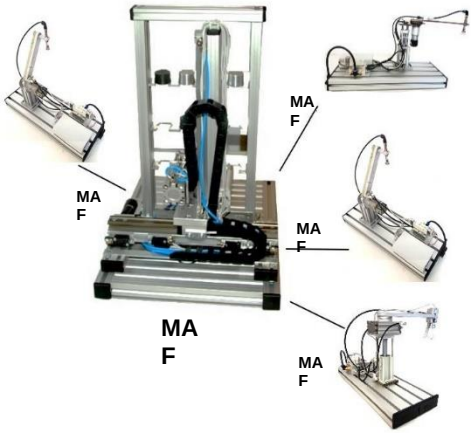
Electro valves: 1 5/2-way valve, monostable, 24Vdc,with led and manual push button.5/3-way valve, 24Vdc solenoids, with leds and manual push buttons

Sensors: 4 "reed" magnetic sensor
1 micro switches
2 encoder with two channels each 1 reflex light barrier sensor

PLC wiring: Digital inputs / outputs 11DI / 5DO

Interface: Interface box with SUB-D 25 pin connector

Combinations



MAF-630
ROBOTIC ARM - DOBOT

The DOBOT Magician Advanced is the arm robot desktop all rounder for countless applications., starting with handling, recording coordinates and positions, tracing trajectories, acquiring and positioning parts at first working individually to later combine it with the various MAF modules to perform an automation process

Thanks to its size and work area, it can be combined with MAF modules. It integrates an interface that allows it to be connected to any PLC, guaranteeing easy communication between the robot and the PLC.

The DOBOT Magician Advanced Communication contains DOBOT Studio - the professional and free software (for Windows and Mac) for controlling your DOBOT Magician. You can quickly program and save any position within its range using the teach and playback function. Here you program your robot arm intuitive and directly on the device. To do this, hold down a button on the head of the DOBOT Magician, guide the robot arm to the desired position and release it at the end point to be programmed

Thanks to its large number of communication modules, the DOBOT Magician Advanced Communication has every imaginable interface out of the box compared to its little brother, the DOBOT Magician Basic. In addition to control via WLAN and Bluetooth, a control pad (similar to a gamepad) and an intuitive app for iPhone and iPad are available. (free download from the App Store).
Whether as a 3D printer, for drawing or for pick and place applications. Thanks to the extensive range of accessories such as vacuum cups, grippers, pen holders, 3D printing sets and much more. the possible uses are extremely diverse. Not least thanks to the high quality optional

The station is mounted on an aluminum base, measures 320 x 400 x 450 mm. Weight 10 kg

Training and learning:
Handling by means of a 4-axis robot arm, programming of coordinates, trajectories and speeds. Acquisition and positioning of pieces by means of a gripper / suction cup on a robot arm. Communication with PLC to work together with adjacent MAF modules. Combination of various technologies

(sensors, electro-pneumatics, mechanics, electricity...) programming, fault location and repair, safety conditions, emergency, etc..

Technical data:

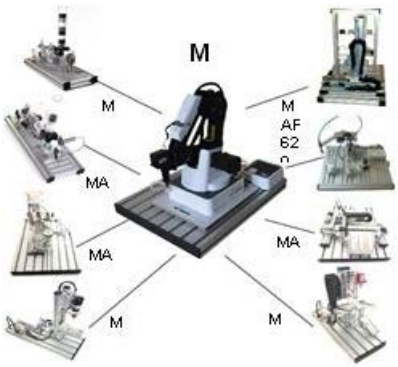
Construction: *F-subplate 320 x 400mm.
*Connection interface
*Mini- compressor for gripper or suction cup
*DOBOT Magician robotic arm

Actuators: 1 robotic arm, 4-Axis-Handling
1 Suction cup / Gripper with mini- compressor

PLC wirings: Digital inputs / outputs 1DI / 1DO

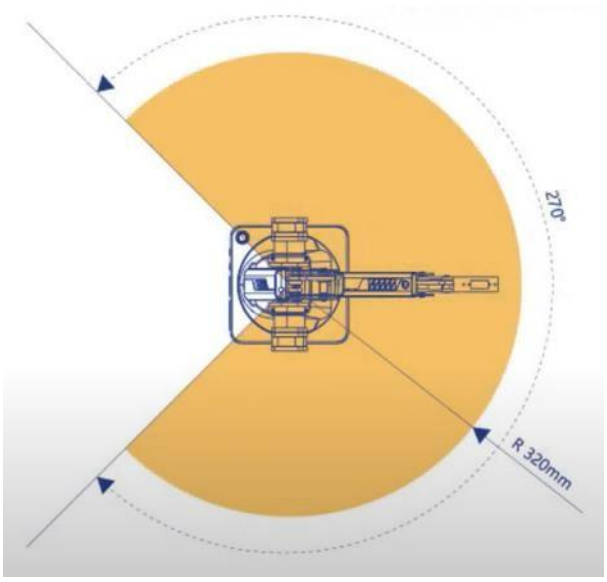
Interface: Interface box with SUB-D 25 pin connector

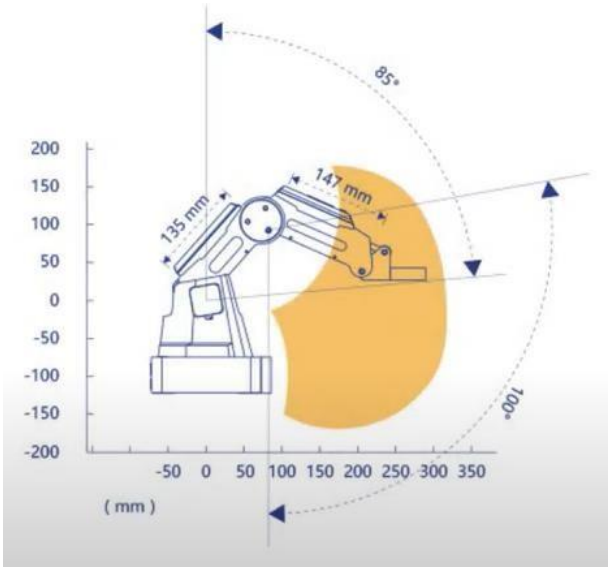
Combinations



DOBOT Magician Advanced
Technical date

Dimension:345 × 290 × 485 mm
Weight: 8 kg
Repeatability: +-0,2
mm Max. load: 500g
Range, ratio: 320
mm Speeds:
Joints 1, 2 y 3: Vmax = 320°/s
Joint Axe 4 servo: Vmax 480°/s
Power supply: 110-240VAC,
50/60Hz Working temperature: -
10 a 60 ºC Inputs / Outputs:
up to 17, as PWM, in/out, or analog
input Accessories:
3D printing set included, pen holder,
pneumatic gripper, suction cup





Delivery composition

- Robotic arm Dobot Magician
- Suction kit:
  Including: suction cups, vacuum pump and 4th servo-axis
- Pneumatic gripper
- 3D printing set incl.:
  Extruder inc., heating nozzle, filament, conveyor line, masking tape and printing plate glass
- Writing and drawing module.

MAF-640

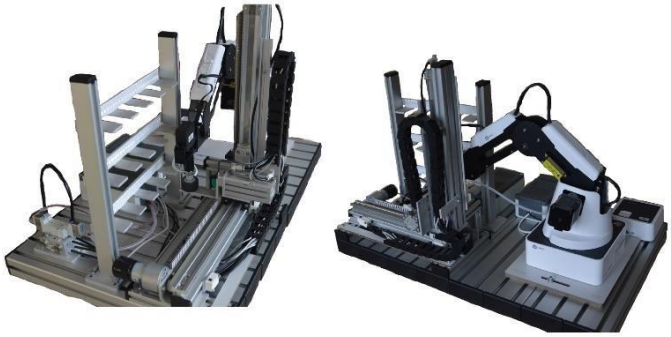
ROBOTIC ARM DOBOT + BLUETOOTH + WIFI + GAMEPAD

DOBOT Robot Arm Assembly similar to the MAF 630 with Wireless communication accessories and Gamepad keypad

Includes:
MAF-630
Bluetooth module
Wi-Fi module
Gamepad and USB module

The station is mounted on an aluminum base, measures 320 x 400 x 450 mm. Weight 10 kg

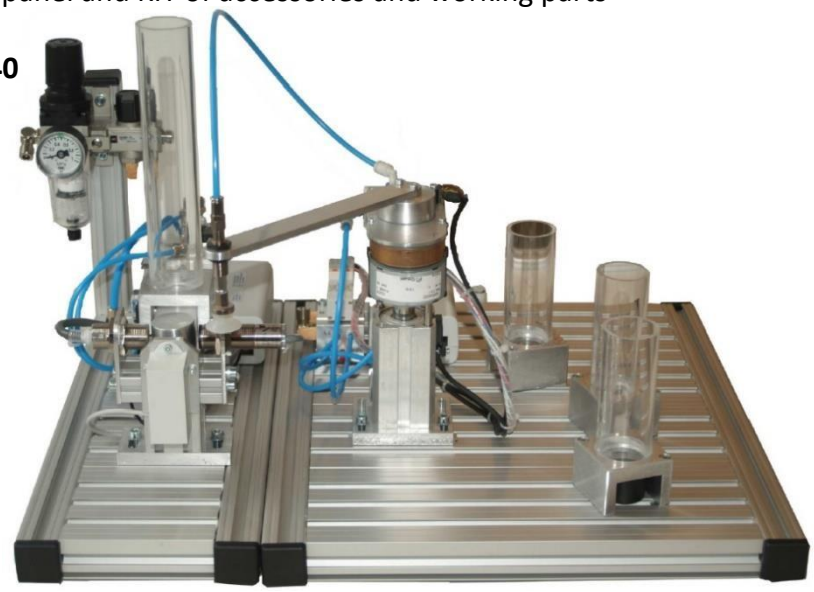
Example combination MAF-620 – MAF-630/640



The images show how the DOBOT robot takes the part from the MAF-620 high rack warehouse

Compact system **MAF -690,** made up by the two modules MAF 500 and MAF 615, FR maintenance unit, control panel and KIT of accessories and working parts

MAF 540
FR unit



MAF 550
KIT of accessories and parts

MAF 500
Gravity feeder with part detection

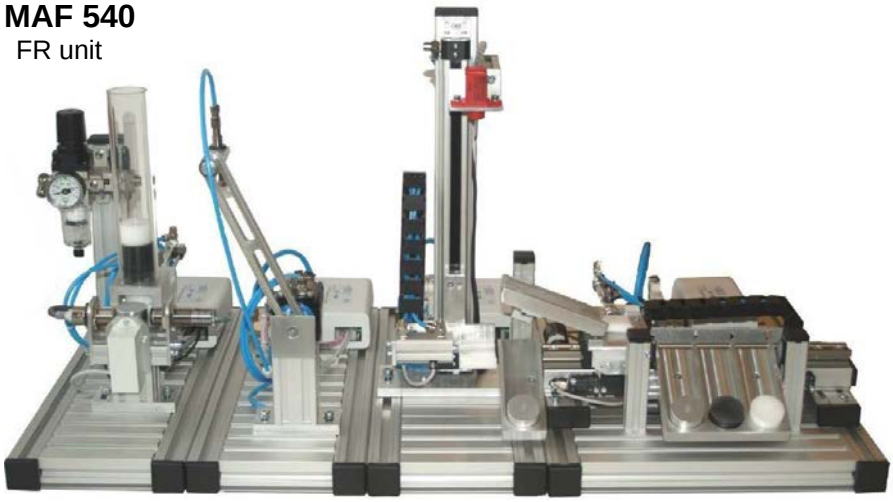
MAF 615
Storage station

MAF 560
Control panel

MAF-700

Compact system MAF -700**,** made up by the 4 modules MAF, FR maintenance unit, control panel and KIT of accessories and working parts

MAF 540
FR unit



MAF 550
KIT of accessories and parts

AF 500
Gravity feeder with part detection

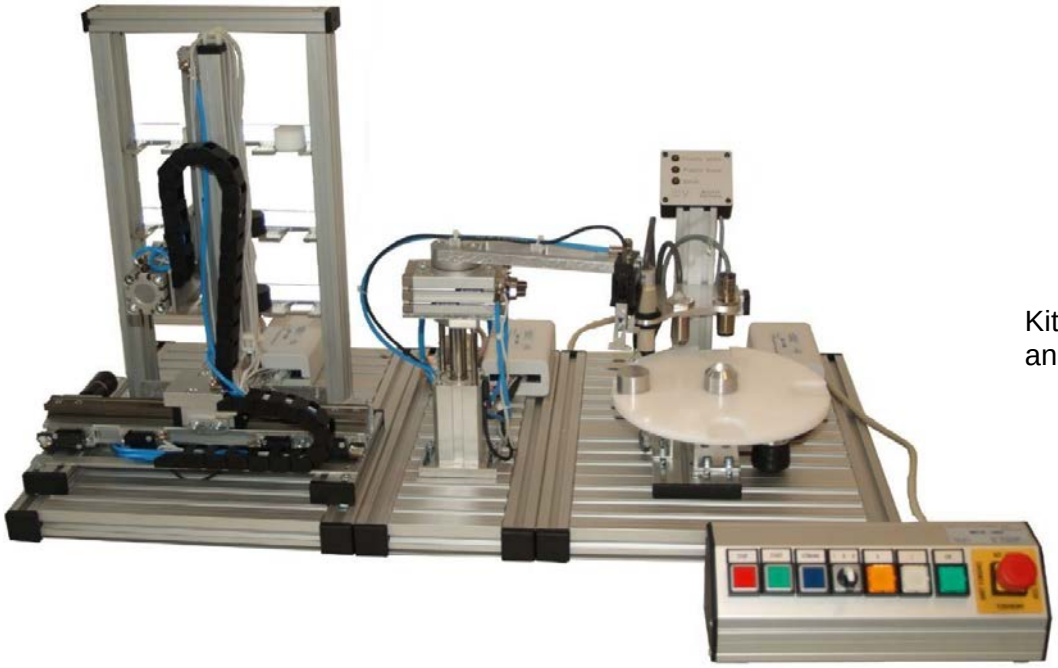
MAF 510
Swivel unit

MAF 520
Analog meter

MAF 530
Sorting station

MAF 560
Control panel

compact system MAF -730, made up by the 3 modules MAF, FR maintenance unit, control panel and KIT of accessories and working parts



MAF-550
Kit of accessories and parts

MAF 620
High rack warehouse

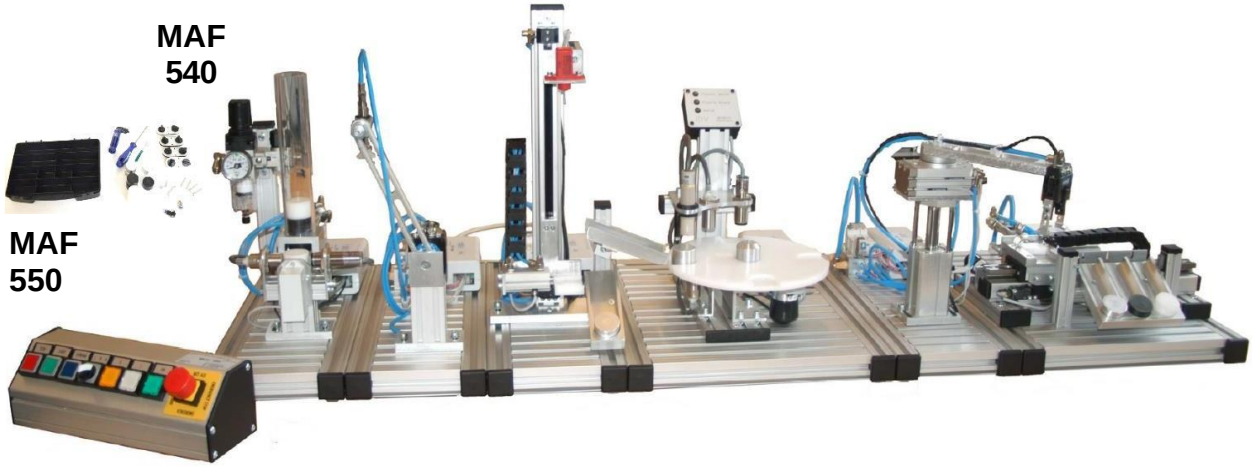
MAF 590
Pick and place pneumatically

MAF 570

MAF 560
Rotary index table

Control Panel

Compact system MAF -730, made up by the 6 modules MAF, FR maintenance unit, control panel and KIT of accessories and working parts.



MAF 560
Control panel

MAF 505
Gravity feeder

MAF 510
Swivel unit

MAF 520
Analog meter

MAF 570
Rotary index table

MAF 590
Pick & place pneumatically

MAF 530
Sorting station

Compact system MAF -740, made up by the 8 modules MAF, FR maintenance unit, control panel and KIT of accessories and

MAF 540

MAF 505
Gravity Feed

MAF 510
Swivel Unit

MAF 520
Analog meter

MAF 570
Rotary index Table

MAF 590
Pick & place Pneumaticall

MAF 530
Sorting station

MAF 550
Kit of accessories and parts

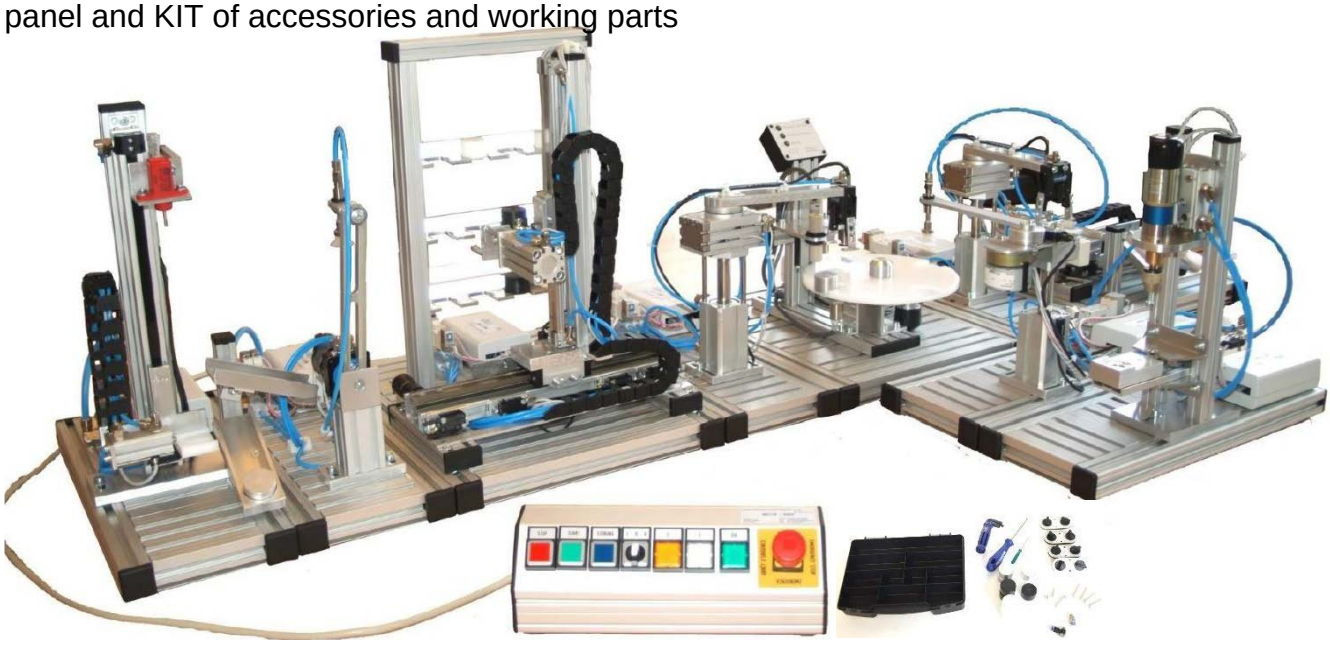
MAF 560
Control panel

MAF 585
Pick & place electrically

MAF 600
Working drill

MAF-760

Compact system MAF -760**,** made up by the 9 modules MAF, FR maintenance unit, control panel and KIT of accessories and working parts



Analog meter Swivel unit Warehouse Pick & Place pneum. Rotary index table Pick & Place pneum. Sorting

MAF 560 Control panel
MAF 550 Kit of parts
MAF 585 Pick & Place electrically
MAF 600 Working drill

ACCESSORIES & PLC´S

MAF-540 FR UNIT

FR pneumatic maintenance unit, filter with semi- automatic water separator, pressure regulator with manometer, manual 3/2 port valve and quick connection fittings.
Filter body in polycarbonate
Adjustable and lockable pressure regulator, pressure range from 0,5 to 8 bar
3/2 valve for opening/closing with silencer
Fittings: tube inlet Ø 6 mm / tube outlet Ø 4 mm FR unit mounted on vertical aluminum profile

MAF modules do not include the FR unit. When a Combined MAF System is available, only one FR unit is required. When you want to control individual modules, you will need one for each module or have a classroom enabled with a maintenance unit.

MAF-569 SLAVE ADADPTER

Adapter for connection via SUB-D connector to the PLC of a slave-base with Ø 4 mm safety sockets. It allows you to easily connect external equipment such as valves, switches, sensors and relays from our electro-pneumatic and electro-hydraulic equipment to the PLC using Bus technology.

Connections:
11 sockets for inputs 8 sockets for outputs 2 sockets for power
1 emergency socket (24)
1 SUB-D25 female connector

MAF-550 ACCESSORIES KIT / WORKING PARTS

A kit of accessories and work pieces is required to work with up to 4 MAF modules

Components:
- 1 Storing box
- 1 Screwdriver, slotted
- 1 Screwdriver, cross
- 1 Allen key set
- 4 Connectors to connect different MAF modules
- 1 angle reduce connector: Ø 6 - Ø 4mm
- 1 straight reduce connector: Ø 6 - Ø 4mm
- 1 straight connector: M5 - Ø 4 mm
- 2 angle connectors: M5 - Ø 4 mm
- 4 locking plug´s: Ø 4 mm
- 9 workpieces, Ø30mm cylinders with different material and height:
  Aluminum: 2 x H=20 mm, 1 x H=21 mm
  Black plastic: 2 x H=20 mm, 1 x H=19 mm White plastic: 3 x H=20 mm

MAF-560
CONTROL PANEL

The control panel consist on a Alu-frame. To place on a surface or work table. The control panel is connected with a 1m cable on a 25 pin D-SUB plug.

- 1 NC push button with lamp included
- 3 NA push buttons with lamps included
- 1 / 2 position switch with interlock
- 2 Lamps
- 1 Emergency push button
- Weight 0.6 kg
- PLC wiring:
  Digital inputs/digital output: 6DI / 5DO

MAF-565
CONTROL PANEL WITH JOY SITCK

The control panel consist of a Alu-frame. To place on a surface or worktable. The control panel is connected with a 1m cable on a 25 pin D-SUB plug.

- 1 NC push button with lamp included
- 3 NA push buttons with lamps included
- 1 / 2 position switch with interlock
- 2 Lamps
- 1 Emergency push button
- 1 Joystick for four positions, with 4 extra outputs
- Weight 0.8 kg
- PLC wiring:
  Digital inputs/digital output: 6DI / 5DO
  Analog outputs: 4AO

MAF-___-SC
SPEED CONTROLLER

Extra device to control the speed of the electric motors integrated in the MAF modules

It has two switch-selectable speed regulation modes:

- Manual regulation by potentiometer
- Regulation by PLC control
  Introducing 0 to 10 Vdc from PLC

The MAF module to be requested in the order with the termination SC (SPEED CONTROLLER), to include the speed regulator.

Available with the following MAF modules:
- MAF-530-SC
- MAF-570-SC
- MAF-585-SC
- MAF-600-SC
- MAF-615-SC
- MAF-620-SC

Available in the following MAF combinations:
- MAF-690-SC (includes one SC regulator)
- MAF-700-SC (includes one SC regulator)
- MAF-720-SC (includes two SC regulators)
- MAF-730-SC (includes two SC regulators)
- MAF-740-SC (includes four SC regulators)
- MAF-760-SC (includes five SC regulators)

Siemens PLC S7-1200 SIMATIC S7-1215C-1PN

PLC ready to work, mounted on a rack to place it on a table and directly connect the MAF module(s) through the integrated D25 interfaces. Includes power supply, 2 analog signal displays and additional sockets and micro-switches for external use, all connected to a Siemens PLC S7 – 1200 (CPU S7 – 1215C PN).

The image shows a PLC ready to work with the superior combination of MAF-760

For lower solutions: MAF-690, 700, 720, 730, 740 this equipment can also be used and in the future be ready in case it is extended to a more complete solution, or request a lower PLC configuration adjusted to the available MAF combination.

Different configurations available for S7 PLC with CPU-1215C on rack are shown, listing the number of inputs and outputs for each MAF combination

MAF-700/1215C

Siemens PLC for MAF-700 combination: 30 DI, 18 DO, 2 AI, 2 AO

MAF-730/1215C

Siemens PLC for MAF-730 combination: 34 DI, 26 DO, 2 AI, 2 AO

MAF-760/1215C

Siemens PLC for MAF-760 combination 62 DI, 46 DO, 2 AI, 2 AO

MAF-760/1215C

Description:

It has 10 DB25 connectors for direct connection of 9 MAF Modules and 1 Control Panel, 2 displays for analog visualization, 4mm sockets for external connection, microswitches for input simulation and indicator LEDs

PLC - S7-1200 (CPU 1215C PN):

-24VDC power supply
-62 digital Inputs, 50 for the MAF combination, 12 free for external use with safety sockets and micro- switches for input simulation and indicator LEDs
-46 digital outputs, 24 DC / 0.5 A, 41 for the MAF combination, 5 free for external use with safety sockets indicator LEDs
-2 analog inputs, +-10 V, 11 Bit resolution, 1 for the MAF, 1 free with safety 4mm socket and connected to potentiometer for simulation
-2 analog outputs, +-20 mA, 11 Bit resolution, on safety sockets with display for current/volts
-Execution time :80 ns (bit), 170 ns (word)
-Integrated High-Speed-Counter, up to 100 KHz
-Word operations, addition´s .....
-Program memory 125 KByte, Data 1 MByte
-16KByte Marker, all useable as holding marker adj

-2048 Timer, all remanent adjustable10ms till 9990s
-2048 Counter, all
remanent adjustable
Ethernet-connection
Programmable with PC-Software (TIA PORTAL) and STEP 7 Basic (included)
Integrated digital and analog simulator
On aluminum frame with 10 SUB-D connectors for the MAF-760
Allows external use through connection by available 4 mm sockets, with laboratory cables and 24 VDC power supply

Siemens PLC S7-1500 SIMATIC S7-1512C-1PN

PLC ready to work, mounted on a rack to place it on a table and directly connect the MAF module(s) through the integrated D25 interfaces. Includes power supply, 2 analog signal displays and additional sockets and micro-switches for external use, all connected to a Siemens PLC S7 – 1500 (CPU S7 – 1512C).

The image shows a PLC ready to work with the superior combination of MAF-760

For lower solutions: MAF-690, 700, 720, 730, 740 this equipment can also be used and in the future be ready in case it is extended to a more complete solution or request a lower PLC configuration adjusted to the available MAF combination.

Different configurations available for S7 PLC with CPU-1512C 1PN on rack are shown, listing the number of inputs and outputs for each MAF combination

MAF-730/1512C

Siemens PLC for MAF-730 combination: 32 DI, 32 DO, 5 AI, 2 AO

MAF-740/1512C

Siemens PLC for MAF-740 combination: 48 DI, 48 DO, 5 AI, 2 AO

MAF-760/1512C

Siemens PLC for MAF-760 combination: 64 DI, 48 DO, 5 AI, 2 AO

Mounted on a frame, as shown in the photo, with 10 DB25 connectors for direct connection of 9 MAF Modules and 1 Control Panel, 2 displays for analog visualization, 4mm sockets for external connection, microswitches for input simulation and indicator LEDs

PLC - S7-1500 (CPU 1516-3 PN/DP):
-24VDC power supply
-64 digital Inputs, 50 for the MAF combination, 14 free for external use with safety sockets and micro- switches for input simulation and indicator LEDs
-48 digital outputs, 24 DC / 0.5 A, 41 for the MAF combination, 7 free for external use with safety sockets indicator LEDs
-4 analog inputs, +-10 V, 16 Bit resolution, 1 for the MAF, 3 free with safety 4mm socket and one connected to potentiometer for simulation
-4 analog outputs, +-20 mA, 16 Bit resolution, on safety sockets with display for current/volts
-Execution time:48 ns (bit operation), 58 ns (word operation)
-Integrated High-Speed-Counter, up to 100 KHz
-Word operations, addition´s .....

-Program memory 125 KByte, Data 1 MByte
-16KByte Marker, all useable as holding marker adj
-2048 Timer, all remanent adjustable10ms till 9990s
-2048 Counter, all remanent adjustable
Ethernet-connection
Programmable with PC-Software (TIA PORTAL) and STEP 7 Basic (included)
Integrated digital and analog simulator
On aluminum frame with 10 SUB-D connectors for the MAF-760

Allows external use through connection by available 4 mm sockets, with laboratory cables and 24 VDC power supply

Street Address: Unit 20 Hughes Industrial Park
Cnr. Oscar and Romeo Street
Hughes, Boksburg
South Africa
1460

Phone: +27 11 823-2678
Fax: +27 11 823-1919

Email: sales@amquip.co.za (International/ General Sales)
marco@amquip.co.za (Sales Manager)
nick@amquip.co.za (Sales Manager)

Website: www.amtectechniquip.co.za

Postal Address: Postnet Suite #71,
Private Bag X01
Farrarmere
Benoni, 1518

GPS coordinates: -26.183503 28.229474

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